THE IRON TRADE REVIEW

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Large Rail Tonnages Are Pending

And Outlook for Domestic and Foreign Orders is Very Bright—Lull in Pig Iron Welcomed

WITH rail buying more active, including 20,000 tons for the Erie, placed with the Illinois Steel Co., and with excellent prospects of heavy domestic demand for leading products and a continuation of the exporting of munitions, the present outlook is exceedingly encouraging. Some contracting for shapes, plates and bars for the first quarter of next year is being done at 1.40c, Pittsburgh.

Machinery

England and France continue to send inquiries for many lathes and other tools, but as delivery is desired before Jan. 1, they are finding it difficult to place orders. It is understood that Cincinnati builders will furnish 100 lathes for December delivery to the French government. As England has not been able to place among the larger builders the order for 1,000 lathes recently sent out, it is picking up machines wherever it can get them. Domestic buying of machine tools is very light. The crane market is active and buying of heavy rolling mill equipment is extensive in the Pittsburgh district.

Ferro Manganese

An occasional shipment of ferromanganese is being made from England and a Youngstown buyer has purchased 2,000 tons for October and November delivery. Companies which are engaged in the manufacture of munitions are being favored by the English shippers.

Cast Iron Pipe

Inquiries for cast iron pipe for shipment to the East Indies and South America are still pending, but are slow in developing into orders. The cast iron pipe market is stronger in the west and an advance of 50 cents per ton has been made at Chicago. Birmingham prices have also been advanced.

Pig Iron

Higher prices on pig iron recently named in Chicago seem to be well established and prices are strong throughout the country. There is at present a lull not unwelcome to sellers, as many buyers hesitate to pay advanced prices for delivery during the first half of next year and furnaces are perfectly willing to await developments. There are reports of some weakness in the Ironton district, but the tonnage is not large enough to have any important effect on the market. A western Pennsylvania buyer is inquiring of valley makers for 15,000 tons of basic, and a West Virginia buyer is in the market for 5,000 tons of basic.

Bars

Sales of rounds for the manufacture of shells have aggregated a large total during the past week and fully 250,000 tons are still pending. Good prices are obtained on the steel sold for export. The demand for domestic consumption is also active.

Plates and Shapes

Indications point to very large buying of shapes and plates for cars and boats at an early date. Several boats have been placed in the east and on the lakes and a number of others are pending and it is confidently believed that several railroads are about to enter the market for a large number of cars.

Coke

About a dozen merchant blast furnaces are about to be blown in and for this reason the outlook for coke is more encouraging. Furnaces are showing greater interest, but there is not yet much real activity in the coke market.

Billets

The scarcity of semi-finished material, particularly open-hearth billets and sheet bars, continues. On a recent inquiry for from 3,000 to 4,000 tons from Scotland, not a bid was forwarded from the east. The high price of sheet bars is having an influence on the sheet market and a scarcity of blue annealed sheets has been reported during the past few days. Manufacturers of automobiles and electrical machinery are specifying heavily on their sheet contracts.

THE OPEN HEARTH

Constructive Regulation

RUSH C. BUTLER, a prominent Chicago lawyer, who has given much attention to government regulation, read a paper this week before the American mining congress at San Francisco, on "Constructive Federal Regulation". Mr. Butler reviews in a very interesting manner the progress which has been made in the regulation of business, beginning with the act to regulate commerce passed in 1887, to prevent various abuses by the railroads. He says that this law has been intensively and broadly constructive and railroads whose management has been capable and honest are benefiting by reason of the regulation. He also commends very highly the pure food and drug act of 1906 and federal regulation of national banks.

Coming down to recent legislation, Mr. Butler discusses the act creating the federal trade commission, which, he says, by properly exercising the powers conferred upon it, can make itself a source of great comfort and relief to the business world. He classifies the functions of the commission as of two kinds, the first being judicial, under the exercise of which it files complaints, holds hearings and enters orders, while the other function may be called inquisitorial, which was intended to be helpful. Mr. Butler calls attention particularly to section 6, paragraph E, of the act, which provides that the commission may investigate and make recommendations for the readjustment of the business of any corporation alleged to be violating the anti-trust acts in order that the corporation may thereafter maintain its organization and conduct of business in accordance with law, but he does not refer to the fact that the decision of the commission is not binding on the courts and that, as has been pointed out by James A. Emery, business men may be led into a trap by going to the commission and asking for rulings. He calls attention especially to the fact that violation of the trade commission act or the Clayton law are not made criminal offenses, indicating that congress considered the criminal provision undesirable and unnecessary.

Mr. Butler admits that in two of the earliest anti-trust cases decided by the Supreme Court, those against the Trans-Missouri Freight Association and the Joint Traffic Association, held that the Sherman law prohibited contracts in restraint of trade among common carriers, but the law has been evoked only once in the past 18 years against common carriers, and that only in a case of greatest emergency. Mr. Butler says that it is conceded on all hands that the carriers make their rates, formulate their rules and regulate their practices by agreements essentially in violation of the Sherman law, but, he adds, by common consensus of opinion, no prosecution is undertaken because it is realized that it is absolutely essential that the provisions of the Sherman law be violated in order that the business of the transportation companies may be properly conducted. "When", says Mr. Butler, "public opinion awakens to a fuller realization of the fact that the Sherman law is better honored in many instances in the breach than in the observance by industrial as well as transportation companies, we shall have realized an important economic situation". This is a rather remarkable proposition for a lawyer to lay down and we believe it would be better to repeal that which cannot be enforced. However, with the main argument presented by Mr. Butler, and especially with his concluding sentences, that "broad, helpful, sympathetic co-operation of business men with each other and with regulating bodies will make the problem of self-government less difficult of solution and insure a greater measure of continued business prosperity", we are in hearty accord.

Based on Sound Principle

THE PLAN to arrange a credit of a billion or a half a billion dollars for England and France rests upon the broad American principle of helping American manufacturers and farmers to place their products with the two foreign countries. Hence we have no sympathy with such unreasonable criticism as is published by the *Staats Zeitung*, of New York, which says in part:

"As we are today informed by reports from Washington, the Wilson administration is already determined to give up the last remnant of alleged neutrality: The Allies need money, so the administration at Washington will mobilize the Federal Reserve banks for them.

"Are we to sit still under those circumstances? Shall we allow ourselves to be bulldozed by the absurd threats of *The World* and *Telegram* not to keep our thumb upon our own money?

"There is need of a mighty agitation in order to choke in the germ this crime, this conspiracy against your property, your life. Every one can help in this. * * * The larger business man must not be so timid now; he must be able to bring a sacrifice to have the American commercial independence. The depositor in the savings banks, which are not directly involved, can do his part—he can urgently request his bank to exercise pressure upon the business bank with which it has relations. This pressure, this protest, must be a general one".

The plan suggested by the New York German paper is thoroughly unamerican and it is an injustice

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to the thousands of Americans of German birth who are willing to do anything in their power to help in upbuilding our foreign commerce. The right to sell to the entente allies or to the Teutonic allies has been thoroughly established and the arrangement of a credit is merely a matter of detail as to the payment. Secretary Lansing has very well stated the position of the administration, which is one of non-interference with the plan which is to be successfully carried out.

In making a purchase, the question of price importance is—what will it cost? No sane man is willing to go ahead blindly and make purchases right and left and not know what they will cost, and that is exactly the position in which importers in England and France find themselves when exchange is fluctuating from day to day. The idea of providing this large credit is to restore the stability of the exchange market. It is not merely to help the allies, but to enable them to pay for the goods which they are anxious to buy in this country. If we do not make this arrangement, the foreign buyer will be compelled to go elsewhere. We are helping ourselves by helping others. Every dictate of patriotism demands that ample credit be promptly arranged for.

Labor After the War

IN A recent address in London, Sir George Croydon Marks, a member of parliament, said that none of the war's changes in social structure will prove so notable to the future historian as the wholesale introduction of woman labor in the trades, occupations and professions hitherto exclusively controlled by men. He said that the question of real interest is whether the future historian will regard the phenomenon as temporary and terminating with the war, or whether the new condition will mark the beginning of a social revolution. "When the war is over", he asked, "shall we see the milk woman and the girl ticket collector at their work, or will they automatically disappear before the returning tide of the civilian armies?" It is not easy to answer this question, but Sir George says that there is a pledge of honor to reinstate the soldier in his position as wage earner when he is able to return from war and that no consideration of economy or efficiency can be allowed to interfere with this pledge of honor. Sir George is undoubtedly right. The pledge of honor will be an important factor, but aside from that, the chances are that women will naturally drift back into the positions for which they are best adapted while men will seek and find their usual employment. There will be, of course, exceptions, for some women naturally will do all in their power to hold on to the positions in which they have been well paid. They are not the natural homemakers and they do not constitute a very large or important part of the population. Most women will be very glad to give up the work and return to the homes.

Another problem which is already being given serious attention is taking care of the cripples. There will be many thousands of men who, on account of having lost an eye, or a leg, or an arm, or even more seriously crippled, will find their efficiency greatly reduced, unless machines can be adapted for their use and special training can be given. This will be done and every effort will be made to show the crippled soldiers how to carry on their work with the greatest efficiency. This will be imperative, not only from a humane standpoint, but to enable each nation now at war to put up the best possible fight after the war to regain and hold its share of the world's commerce.

Co-operation of Business Men

PRESIDENT WILSON recently received, with apparently great interest and sympathy, suggestions made to him by Bernard M. Baruch, of New York, with regard to a plan looking to the participation of business men in any program to increase the national defense. Mr. Baruch, who had a personal interview with the President, suggested the appointment of a commission of business men to "mobilize" the business resources of the United States so that these forces could be pressed into immediate use in case of war. Germany, it was explained, in preparing for war, organized her business and industrial resources. Mr. Baruch's idea has been concurred in generally by business men.

When relations between the United States and Germany were extremely delicate some weeks ago, steel men from Pennsylvania called upon President Wilson and assured him that their plants would be placed at the disposal of the government in case of war. Offers of similar character have come from other sections of the country. Through these and other sources the administration is understood to be in possession of an immense amount of data as to resources of the country which could be called upon in the event of hostilities. Even though the activities of Dr. Dumba, ambassador from Austria, whose recall has been requested by the United States, had been successful and strikes among Austro-Hungarians in steel mills and other plants engaged in the making of munitions had occurred, it is felt that the government could readily obtain labor in these plants if they were to be devoted to making material for the United States.

Prices Present and Past

Quotations on leading products September 22, average for August, 1915, average for June, 1915, and average for September, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Sept. 22, 1915.	Average for Aug., 1915.	Average for June, 1915.	Average for Sept., 1914.
Bessemer pig iron, Pittsburgh..	$16.95	$15.89	$14.58	$14.90
Basic pig iron, Pittsburgh.....	15.95	14.89	13.54	13.90
No. 2 Fdy. pig iron, Pittsburgh	15.45	14.70	13.45	13.90
Northern No. 2 Fdy., Chgo....	14.25	13.38	13.00	13.50
Lake Superior Charcoal, Chgo..	16.25	15.75	15.25	15.75
Mall., Bess., Chgo.....	15.00	13.38	13.00	13.50
Southern No. 2, Birmingham...	11.50	11.13	9.55	10.00
Southern Ohio No. 2, Ironton..	14.50	13.69	12.50	13.00
Basic, eastern Pa.....	17.25	15.25	13.75	14.00
No. 2X Virginia furnace.....	13.25	12.50	12.50	12.50
No. 2X foundry, Philadelphia..	16.25	15.50	14.25	14.25
Ferro mang., Balti., (prompt)..	115.00	105.00	105.00	80.00
Bessemer billets, Pbgh.....	25.00	23.00	19.87	21.00
Bess. sheet bars, Pbgh...25.00 to	26.00	24.00	20.37	22.00
Op.-h'th sh. bars, Pbgh...26.00 to	26.50	25.00	20.37	22.00
Open-hearth billets, Pbgh.....	26.00	24.00	19.87	21.00
Steel bars, Chgo.....	1.54	1.49	1.39	1.38
Steel bars, Pittsburgh.....	1.35	1.30	1.20	1.20
Iron bars, Philadelphia.....	1.45	1.30	1.20	1.20
Iron bars, Cleveland, local del'y.	1.30	1.22	1.20	1.20
Iron bars, Chgo. mill.....	$1.35	$1.23	$1.15	$1.07
Beams, Chicago	1.54	1.49	1.39	1.38
Beams, Pittsburgh	1.35	1.30	1.20	1.20
Beams, Philadelphia	1.509	1.409	1.359	1.30
Tank plates, Pittsburgh.....	1.35	1.30	1.15	1.185
Tank plates, Chicago.....	1.49	1.44	1.31	1.38
Tank plates, Philadelphia.....	1.509	1.409	1.359	1.30
Sheets, blk., No. 28, Pbgh.....	1.90	1.83	1.80	1.95
Sheets, blue an., No. 10, Pbgh.	1.50	1.36	1.35	1.40
Sh., galv., No. 28, Pbgh., nom.	3.65	3.93	4.46	2.95
Wire nails, Pittsburgh.....	1.75	1.61	1.55	1.55
Connellsville fur. coke contr...	1.75	1.75	1.65	1.75
Connellsville fdy. coke, contr...	2.40	2.25	2.25	2.35
Heavy melting steel, Pbgh.....	14.75	13.38	11.75	11.44
Heavy melting steel, east'n Pa.	15.00	13.75	11.25	10.75
Heavy melting steel, Chgo.....	12.00	11.50	9.37	9.37
No. 1 wrought eastern Pa.....	16.50	15.25	13.00	12.50
No. 1 wrought, Chgo.....	10.75	10.12	8.75	8.31
Rerolling rails, Chgo.....	13.50	11.75	10.00	10.87
Car wheels, Chgo.....	11.75	11.38	9.87	10.75

(For Additional Prices See Page 598.)

Higher Pig Iron Prices Prevail

In the Chicago District—Market Quiet But Firm in Nearly All Centers

Chicago, Sept. 21.—Makers of pig iron in the Chicago district seem to have had no difficulty in establishing the advanced quotation on foundry and malleable iron announced last week. Malleable iron is being quoted at $15, Chicago furnace, for this year's delivery and $15.50 for first half of next year. Although considerable buying of malleable took place during August, inquiry and sales of this grade are practically negligible at present.

No. 2 foundry iron is now quoted at $14.25, Chicago furnace, for delivery over the remainder of this year and $14.75 for first half. Each additional 1 per cent of silicon over 2.25 costs the melter $1.

Most furnaces are well sold up for the remainder of this year and melters seem to be well provided for the most part until Jan. 1, and such activity as is manifest in the market is for delivery during next year. Some small prompt business is being done, but these sales are mostly against the chance of some present contracts not being ordered out during the year.

Southern iron is quiet and northern, even at the advanced quotation, is still too low to allow active competition except at outside points where a freight advantage is gained. Most southern makers are asking $12, Birmingham, for No. 2 foundry for delivery during this year with 50 cents additional for first half. One interest is quoting $11.75, Birmingham, on a limited tonnage. Some sales are being made in competitive territory for next year's delivery at $12.50, Birmingham.

Jackson county silveries have been advanced 50 cents per ton and 8 per cent is now quoted at $20, delivered, Chicago.

Lake Superior charcoal iron is firm at $16.25 delivered, Chicago, for Nos. 1 to 4, with 50 cents per ton additional for No. 1 special and soft and $1 per ton additional for Scotch.

Buyers Hold Off in East

Philadelphia, Sept. 20.—Quieter market conditions continue to prevail in pig iron in this territory due apparently to the unwillingness of buyers to take hold of the advanced prices for forward delivery, particularly after Jan. 1, at the present time. The makers are holding firmly to their schedules, however. In view of their heavy bookings for the rest of the year and the fact they have yet to cover upon coke and ore, they are indifferent about adding much tonnage for first quarter or beyond except at their own price. Steelmaking grades remain in a more assured position than foundry iron. A Philadelphia steelmaker is out for 5,000 to 10,000 tons of basic for forward delivery. It is reported to have been offered western metal under $17.50, delivered, and from the odd figure mentioned, it has been thought that it may be Ohio iron. There still is doubt whether the Coatesville buyer who placed 35,000 tons with eastern makers a week ago bought any iron from outside districts, as has been persistently rumored. The freight makes it questionable whether any western iron was taken, but the point remains to be cleared up finally. Other eastern basic business is talked about, but has not come to a head. It is doubtful whether any iron of this grade now is obtainable under $17.50, delivered. Sales of standard low phosphorus by sellers here totalled 5,000 to 6,000 tons and prices ranged from $24.50 to $25.50, Philadelphia, depending on delivery. Some metal for this year went at $25, Philadelphia. The market continues very strong. Lebanon low phosphorus iron is held at $20, furnace. Foundry iron is rather slow. It is reported that

(*For complete prices see page* 598.)

some eastern brands for this year still can be picked up at $16, Philadelphia, for No. 2X, but the general range is $16.25 to $16.75. There is a wide range on such prices as are being named for next year and that market is not clear, since there is not much buying. A Reading buyer took 1,000 tons. Pipe makers are reluctant to pay what the furnaces ask for low silicons. The Virginia Iron, Coal & Coke Co. has advanced for this year No. 4 forge to $12.75, furnace, the same as No. 3. It still asks $14 for No. 2X and $13 for No. 2 plain for this year and will do the same No. 2X figure for next year.

Buyers Are Backward

New York, Sept. 21.—A quiet week has prevailed in the pig iron market in metropolitan and adjacent territory. Consumers still are backward in accepting the higher prices asked by makers for next year's delivery and for this year their requirements are well filled. The situation is not without satisfaction to various makers, as most of them have not much iron to sell for this year. The American Brake Shoe & Foundry Co. is out for 3,000 to 4,000 tons of various grades for shipment to several plants over the next five months. The International Steam Pump Co. is figuring on 2,000 to 2,500 tons of foundry iron for first half for Harrison, N. J. Another inquiry for 2,500 tons of special grades is pending. At Buffalo a steel company is understood to have closed for a block of bessemer from one of the merchant sellers there. The tonnage has not been stated. In spite of the inactivity of buying, prices hold well. The tidewater market for No. 2X for this year rules at about $16.25 to $16.75 and for next year at $17 to $17.50. The Pulaski Iron Co., a Virginia producer, has advanced to $14, furnace, for No. 2X for first quarter, placing its schedule on the same basis as that quoted by the Virginia Iron, Coal & Coke Co. The export market is inactive. France has inquired for 1,000 tons more of bessemer.

Pig Iron Market Broadens

Pittsburgh, Sept. 21.—The pig iron market in the Greater Pittsburgh district is broadening. Consumers in adjacent territory, who usually obtain requirements from nearby stacks, have entered the valley market for steel making grades for delivery after Jan. 1. A prominent western New York railroad equipment concern, which hitherto has purchased most of its iron at Buffalo, is asking valley blast furnace managers to quote on about 15,000 tons of basic for delivery the fourth quarter of this year and the early part of 1916. A West Virginia manufacturer is negotiating for 5,000 tons of basic for first quarter shipment and numerous melters in the immediate territory quietly are figuring needs. Shipments of bessemer iron to Italy continue heavy; approximately 25,000 tons of bessemer iron have been sold to English and Italian interests the last five months. Sharpsville furnace is getting ready for the torch; it will blow in on bessemer iron and the output of the stack will be sold by a local broker over a period of six months or longer. The middleman will furnish fuel for the furnace. The Valley Mold & Iron Co., the Robesonia Iron Co. and the Reading Iron Co. each will blow in one furnace at an early date.

Buffalo Market Stronger

Buffalo, Sept. 21.—While sales aggregating but a small tonnage have been made by the Buffalo furnaces during the past week, the market evidences increasing strength. Prices are firmer. One interest booked 3,000 tons of basic at $16.00 for delivery over the last quarter. Steel making iron is holding at $16 to $16.50.

Melters are becoming more insistent for deliveries of iron under contract and some users who had previously felt they were covered for their needs for the remainder of the year are coming into the market for additional tonnages. There are signs of increasing activity on the part of stove making interests that have been somewhat dull for a long period.

Furnaces are not actively soliciting orders for deliveries into 1916. Prices being quoted, however, overlap the end of the year and for the most part cover negotiations for deliveries over fourth quarter of this year and the first quarter of 1916. Where the needs of the consumers for the next six months are concerned, the price of foundry grades and malleable is covered by a spread of $15.00 to $16.50. The prices quoted by the interests virtually sold up over the remainder of the year are approximately $1 per ton higher than the quotations coming from the interest having available last quarter tonnage to book.

Lull at Cleveland

Cleveland, Sept. 21.—There is a lull in pig iron buying, as consumers are pretty well covered for the last half of this year and furnaces are not urging contracting for the first half of next year. Prices are firm and deliveries are going forward satisfactorily on contracts.

Prices Stronger

Cincinnati, Sept. 21.—The minimum price for southern No. 2 foundry is now $11.50, Birmingham basis, for the last quarter, and $12.50, Birmingham basis, for the first quarter of next year. Southern Ohio No. 2 foundry has been advanced to $14.50, Ironton basis, for the last quarter, and $15, Ironton basis, for the first half. A large amount of speculative iron may be thrown upon the market at any time, but the prices at which it will be offered are very uncertain. Some speculators state that they intend to hold their iron with the belief that the market will go higher before the end of the year, and others are showing a disposition to dispose of their lots as soon as posible. Buying and selling are at a low ebb, and transactions during the past week aggregate a very small tonnage. Inquiries include 4,000 tons of foundry iron from Chicago territory, 600 tons and 500 tons of charcoal iron in separate lots from Michigan, and 400 tons of foundry iron from central Ohio. The Louisville & Nashville railroad has taken 500 tons of special analysis iron, and the Nordyke & Marmon Co., Indianapolis, has purchased 500 tons of foundry iron.

Prices Firm

St. Louis, Sept. 21.—Prices are firmer and the outlook for a marked improvement in the pig iron situation here is better than for some months. Sales last week included 2,000 tons of southern No. 2, 1,000 tons of northern, 1,200 tons of southern No. 2 to the foundries in Belleville, Ill., 300 tons of northern and 400 tons of southern iron. The inquiry for 1,000 tons of malleable that has been on the market several weeks is expected to result in a sale shortly. Southern No. 2 is quoted at $12.50, Birmingham, for delivery over the remainder of the year, and at $13 for first half of next year. Northern iron is held at $14.50, Ironton, for this year's delivery, $15 for delivery next year, and $14 to $14.50, Chicago, for this year and $14.50 to $15 for first half of next year.

Fair Inquiry

Birmingham, Ala., Sept. 20.—Another week has passed without change in the local pig iron market. Inquiry still is fairly active and prices are unchanged. Some business is being done, but largely in small lots of a few tons each. Inquiry now is largely for 1916 delivery, for which the quotation remains at $12.50 for the first quarter. Spot business remains at $11.50 No. 2 foundry, Birmingham.

The Wellston Steel & Iron Co., Wellston, O., will blow in one of its stacks some time this month.

(*For complete prices see page* 598.)

Plates for More Boats

Eastern and Lake Ship Yards Figure on Many Propositions—Large Tonnages on Books of Eastern Mills

Philadelphia, Sept. 20.—One eastern ship yard is figuring at the present time on new propositions involving six vessels. The Ward line has placed a second 5,000-ton boat with the Seattle Dry Dock & Construction Co. for the New York & Cuban Mail Steamship Co. because of its inability to get deliveries from Atlantic coast yards. This boat is to be delivered in about a year. The ship yards are piling heavy orders with eastern plate mills at present and the railroads are specifying better for shop work, the Reading, Pennsylvania and other systems releasing good lots. The Pennsylvania is proceeding with the building of 10 to 20 additional locomotives at Altoona. Locomotive builders also are doing better. Miscellaneous orders are good, so that eastern plate makers have all the tonnage they can handle. One mill reports the largest accumulation of rolling orders at any time in its history. It is delivering universal plates in three to four weeks and sheared in six weeks. Current orders generally are held at 1.40c, Pittsburgh, or 1.559c, Philadelphia, but some plants still will accept 1.35c in cases. In one instance, a buyer paid 2c, mill, for a carload for immediate delivery. A number of inquiries for first quarter contracts are out, but makers are declining to quote. One mill asks 1.45c, Pittsburgh, for last quarter, but others will do 1.35c to 1.40c. The 11,000 tons of plates for various navy yards scheduled for bids tomorrow has been deferred a week. Figures go in tomorrow on 1,600 tons for the Panama canal. On an inquiry for 300 tons of ship plates for the British Isles, better than 1.50c, seaboard, was offered by the buyer, but freight room could not be obtained.

Car Buying Under Way

Pittsburgh, Sept. 21.—More important builders of steel cars throughout the country are asking mills to reserve heavy tonnages of plates and shapes, indicating, it is believed, that a car buying program is under way. It is understood that at least 10,000 cars are involved in pending negotiations. Car builders realize they will find it extremely difficult to obtain material later in the year, if demand continues at its present rate. Plates have hardened somewhat and it is seriously doubted whether the average consumer could shade 1.35c. Small tonnages for prompt delivery have commanded 1.40c.

Figuring on Boats

Cleveland, Sept. 21.—The Toledo Shipbuilding Co. has been figuring on a number of boats and it is understood to have closed for one which will require from 2,000 to 3,000 tons of plates, while a second boat is likely to be placed soon, with two more under consideration. While the plate market has not kept up fully with recent advances in bars, the minimum quotation now seems to be 1.35, Pittsburgh, and 1.40c is being paid in some cases. Eastern plants are so well supplied with business that they are unable to make deliveries in less than four to six weeks and they are firmly adhering to the highest prevailing quotations.

Plates Hold Position

Chicago, Sept. 21.—Steel plates continue firm at $1 per ton less than other finished steel products, 1.49c, Chicago mill, being the current quotation by smaller producers. This price is made as an inducemnt to split orders and give smaller mills their share of narrow sizes. Until increased car buying is a factor in the market, plates are not expected to assume their usual position with shapes and bars. Indications are present in the market that considerable increase in demand for railroad equipment will be manifested soon, and this is expected to help the demand for plates materially.

Confined to This Year

Buffalo, Sept. 21.—Considerable pressure is being brought to bear on mills to quote prices on plates for deliveries through the first quarter of 1916, but the mills up to the present are not disposed to open their books as yet, confining sales to what tonnages may be available for shipment over the remainder of the year.

Tubular Market Quiet

Pittsburgh, Sept. 21.—The market for tubular goods remains inactive. Recent advances in crude oil prices apparently have not been sufficient to stimulate activity in the oil country fields. The National Tube Co. today sent out notices to the effect that prices on oil country goods will be withdrawn Sept. 30. Specifications for merchant pipe show snap, but sales of line pipe have not been heavy. Boiler tubes continue weak and irregular. Demand for seamless tubing is decidedly heavy and deliveries are deferred six months in some instances.

(*For complete prices see page* 598.)

Billet Prices

Continue High and Very Few Rates are Being Made

Philadelphia, Sept. 20.—Only small tonnages of billets can be offered for the remainder of the year by leading eastern Pennsylvania makers, in view of their large order books. It is on the occasional sales of such size that the high prices recently noted in this district chiefly have been obtained from domestic buyers and are continuing. An eastern car builder bought 500 to 1,000 tons in the week within the range of $28 to $30 mill for rerolling billets. Ohio makers quoted $28 mill or about $31 Philadelphia basis on the lot. Forging billets range from $34 to $40 mill according to analysis. Recent export orders brought considerably more than the maximum figure. Usually export orders are being passed by the mill at present. On a recent inquiry for 3,000 to 4,000 tons from Scotland, not a single bid from the east was made. The large tonnage of billets recently inquired for by eastern car builders, apparently to cover a shell contract, remains pending.

Strong at Pittsburgh

Pittsburgh, Sept. 21.—Demand for billets for the manufacture of rounds continues decidedly heavy and the shortage of material is becoming more acute. The sheet bar market is not so active as it was a few weeks ago, although prices continue high. Sheet mill capacity gradually is becoming more fully engaged and it is probable prices of sheet bars for fourth quarter delivery will be somewhat above those now prevailing. Wire rods are being held at $30 a ton, Pittsburgh, by leading producers.

Builds Additions.—The Oakes Co., Indianapolis, on a new factory site has erected three large factory buildings, providing modern facilities and equipment, and increasing the capacity of company to 2,000 fans a day. The increased business for the Oakes cooling fans for motors and other Oakes specialties, necessitated this new and commodious plant, and even with these enlarged quarters, Will H. Oakes advises that the company is running night and day shifts in order to make 60-day delivery.

Heavy Sales of Bars

In Form of Large Rounds Made for Shell Manufacture—Large Lots Still Pending

New York, Sept. 21.—Large orders for shrapnel and high explosive shells for delivery next year are about to be placed in this country by France through its commissioners here and these pending contracts seem responsible in the main for a record-breaking amount of inquiry for steel rounds and other shell stock now pending. Probably at no time since ammunition manufacture became a factor of first importance in the bar market has the tonnage been so great and diversified as at present, and it does not appear extravagant to say that these easily will run from 200,000 to 300,000 tons and may exceed considerably these figures. One or two lots of 50,000 tons each are before the mills. J. P. Morgan & Co. is asking for 20,000 tons of 5 1/3-inch shell stock for France. The American Brake Shoe & Foundry Co. is understood to be figuring on 15,000 to 20,000 tons; the Laconia Car Co. on 5,000 to 10,000 tons; a Gloucester, Me., company on 6,000 tons, and there are many other inquiries of similar or larger size. Some heavy sales were closed the past week for shipments running into next year. Few of the mills have any shell steel to offer for this year, but one important producer by rearrangement of its capacity, is able to take on about 20,000 tons. The unceasing demand keeps large rounds around 3.00c, mill, and it is doubtful whether below 2.75c, mill, now could be done on even the largest quantity. Specifications against steel bar contracts from the regular domestic trade are active. Those from the jobbing trade especially are up to full quotas. None of the mills are soliciting first quarter business, but in various cases some of them have quoted 1.40c, Pittsburgh.

Large Rounds Sold

Philadelphia, Sept. 20.—Heavy tonnages again have figured in the market for large rounds for shell manufacture in this territory the past week. These aggregate well over 50,000 tons. One eastern Pennsylvania engineering works which has been placing orders for rounds in behalf of itself and several other plants, bought this week 35,000 to 40,000 tons additional of 3 7/16-inch size. Another heavy block was closed for eastern delivery but details are not available. The Baldwin Locomotive works recently took 10,000 tons which it is understood are part of the requirements that have been inquired for by a Cleveland plant to which the forgings of a large shell contract have been sub-let. Some of the lots ordered in the week, the deliveries on which run well into next year, were placed at slightly over 2.80c, mill. Smaller lots for earlier shipment are quoted from 3c, mill, upward. Current inquiries are very large. One eastern maker now has about 175,000 tons before him including 60,000 tons for direct export. An inquiry for 35,000 tons of 3¼-inch rounds for Russia has been offered here. Other new lots out include 1,000 to 1,500 tons for an eastern Pennsylvania maker of boilers, 1,100 tons for a car builder, a small lot for Chester, Pa., and others. From the regular bar trade, specifications remain very good. The larger makers now promise deliveries in 12 to 14 weeks. New buying is quiet, but it is understood some makers will take first quarter contracts at 1.40c, Pittsburgh. The Carnegie Steel Co. and the Jones & Laughlin Steel Co. are low bidders on about 2,000 tons, largely bars, for the bureau of construction and repair, ordnance and steam engineering of the navy department. A lot of 2,500 tons to be bid upon tomorrow for various navy yards has been postponed for a week.

Steel Bars Strong

Pittsburgh, Sept. 21.—Demand for steel bars is decidedly heavy. Domestic consumers and manufacturers of war material are specifying to the full extent of contracts and new buying is heavy. While no particularly large single orders have been placed this week, purchases have involved heavy tonnages in the aggregate. Steel bars are strong at 1.35c, with some mills asking 1.40c for immediate shipment. More important manufacturers are unable to promise deliveries in less than from three to six months.

Steel Bars Firm

Chicago, Sept. 21.—Steel bars are almost unobtainable in this market for the remainder of this year. Mills are practically sold up and specifications are being received in a way to indicate that virtually all tonnage on contracts will be specified before the first of next year. Large inquiries for shrapnel bars are current, but comparatively little is being placed in this territory under the present conditions of pressure. Every mill capable of rolling bars or rounds is being pressed into that service, if its natural product is not in sufficient demand to keep it occupied.

Bars are selling at the established quotation of 1.54c, Chicago mill, without any tendency toward shading. Hard steel bars are in slightly better demand at 1.30c to 1.35c Chicago mill, and specifications for this class of material are increasing.

Bar Iron Improving

Chicago, Sept. 21.—Efforts of bar iron manufacturers in this territory to establish the quotation of 1.35c, Chicago mill, announced last week, have met with considerable success and some tonnages have been contracted at that figure. Inquiries on which quotations of 1.25c had been made previous to the increase, have been closed for the most part, some at 1.25c, and others at 1.30c, Chicago mill.

New business is slightly more plentiful and mill tonnages are being increased while operations are on a better basis than previously.

Conflicting Stories

Cleveland, Sept. 21.—Conflicting reports are current in regard to the contract for rounds for shells to be manufactured by the Hydraulic Pressed Steel Co. One statement is that a price of 2.50c was obtained. The other bidders seem to have named 3c or higher, except on some tonnage for distant delivery.

Prices of shafting are firm and while 64 off can still be done, the prevailing discount is 62. The outlook is that 60 will soon be named. In that event, the price will be higher than at any time in the past five years.

Reinforcing Bars

Buffalo, Sept. 21.—A number of reinforced concrete construction jobs are being figured requiring in the aggregate a large tonnage of reinforcing bars. The Corrugated Bar Co., Buffalo, is to furnish 350 tons for the factory addition for the New Process Gear Co.'s plant at Syracuse. Heavy tonnages have also been sold by the same company for delivery in the west and middle west.

Sellers Besieged

Buffalo, Sept. 21. — The mills and agencies report that the producers are besieged by a demand far in excess of their capacity to meet. Deliveries are becoming more extended. Consumers who had been urged months ago to cover for their requirements and to anticipate their needs by early specifying are now realizing the crowded condition of the mills in bars and other finished

(*For complete prices see page* 598.)

lines. There is every indication that 1.40c will be asked shortly for what available tonnages remain for deliveries over the remainder of the year and that when the mills open their books for business for the first part of 1916, there is likely to be a further advance over the prices for 1915 deliveries. The market presents a situation of buyers seeking to buy and an attitude on the part of the mills of trying to avoid making further sales.

Hoops, Bands and Shafting

Pittsburgh, Sept. 21.—Cold rolled steel shafting was advanced $2 a ton last week and now is being held at 62 per cent off the list for carload tonnages. That figure represents the market in this district. Makers are unable to promise material before Jan. 1. Steel hoops are firm at 1.40c and steel bands are commanding 1.35c. Deliveries of both products are deferred several weeks.

Coke Buying

In Large Volume Seems Near—Some Furnaces Cover

Philadelphia, Sept. 21.—Indications from this territory point that a general buying movement in furnace coke for shipment after Jan. 1 is not far distant. Buyers in this and other sections have been waiting for the producing interests to fix upon a first half price. Some producers, at least, now seem willing to name a price of $2.25, Connellsville ovens, for first half or all-year and already several of the eastern Pennsylvania furnaces have taken advantage of this and have closed contracts. These have not been extensive as yet, aggregating about 10,000 tons monthly, but further negotiations are pending. Producers also have proposed to buyers various sliding scale arrangements based on pig iron prices. One of these provides for a base figure of $1.75, ovens, with 1/5 of the advance in iron; another for a $2 oven base with 1/6 of the advance in iron. Both valley basic and eastern Pennsylvania No. 2X have been suggested as the determining grades. Prompt furnace coke or for shipment this year shows a considerable range of prices which, as quoted in the east, is from $1.75, ovens, upward. A Lehigh valley furnace bought 7,500 to 8,500 tons monthly for this year.

Some Fuel Sold

Pittsburgh, Sept. 21.—Several idle blast furnaces have covered coke requirements for the next few months. The Sharpsville furnace will obtain fuel from a local broker, who will sell the output of the furnace. The Reading Iron Co. has bought coke for one of its stacks and the Robesonia Iron Co., Ltd., has purchased for its furnace at Robesonia, Pa. Alice furnace of the Valley Mold & Iron Co. is being prepared for the torch. The Reading, Alice and Robesonia furnaces require about 17,000 tons of coke a month. Most cokemakers are asking $2 a ton for shipment the remainder of the year, although reports of sales at less than that price are heard. So far as can be learned, no fuel for shipment after Jan. 1 has been sold recently. Neither buyers nor sellers appear anxious to enter into contracts, except on sliding scale arrangements. Seventy-two hour coke is active and prices are gradually advancing. Considerable by-product foundry coke has been sold by the Dunbar, Pa., interest. *The Connellsville Courier* for the week ending Sept. 11 says production was 387,703 tons, an increase of 7,768 tons compared with the week previous.

Coke Inquiry Out

Cincinnati, Sept. 21.—A furnace interest in this territory is inquiring for about 20,000 tons of coke for first half delivery. Another stack has been feeling the market for several weeks for about 40,000 tons of fuel, but has not put out a definite inquiry. Prices on furnace grades are strong, and an advance is being predicted by several coke producers before the end of the month. Shipments of both furnace and foundry grades are exceptionally good on old contracts.

Ferro Shipments

Coming to Manufacturers of Munitions for Allies

New York, Sept. 21.—Occasional shipments of English ferro-manganese are reaching eastern seaboard, but these, it is understood, chiefly are for the account of plants manufacturing munitions for the allied governments. Special dispensation is being made by the British government in these cases, so that the operations of these plants may not be interrupted. A lot of this kind, 500 tons, arrived by the MANCHESTER, the past week. A shipment for the general trade, licensed for October to one seller and referred to recently, probably will not be over 1,000 tons. Agents of at least two of the English makers still are unable to ship at present.

Carload sales of spot ferro-manganese continue to bring about $110 to $115, seaboard. Further transactions of resale metal at these figures were closed within the week in eastern territory. The contract price for ferro-manganese remains unchanged at $100, seaboard. A Youngstown steel maker who bought 2,000 tons for first half is understood to have paid this figure, but the tonnage was merged with a previous contract at a lower price.

The manganese ore market shows considerable activity. Two additional cargoes of Indian ore have been sold to independent Pennsylvania steel makers at 42 to 43 cents per unit, tidewater. Some further lots of Cuban manganese ore have been sold at the full schedule for domestic ore recently announced by the Carnegie Steel Co. Buyers have been approached by Cuban mining interests with propositions to push the development of manganese deposits there now inactive, if sufficient tonnage is purchased.

Buys 2,000 Tons of Ferro-Manganese

Pittsburgh, Sept. 21.—A prominent Youngstown manufacturer has closed negotiations for 2,000 tons of ferro-manganese for shipment in October and November; it is understood the material was obtained at about $100, seaboard. Some dealers are offering small lots at $102, seaboard, although quotations as high as $115 are reported. The market for ferro-alloys and steel making metals reflects strength all along the line. Manufacturers of high speed tool steel experience difficulty in obtaining necessary market requirements. Prices of ferro-alloys and steel making metals appear elsewhere in this issue.

High Speed Tool Steel Advanced

Pittsburgh, Sept. 21.—The Vanadium-Alloys Steel Co., under date of Sept. 13, sent out new prices for high speed tool steels, showing advances of about 15 cents a pound over the last previous schedule adopted Aug. 18. Other makers have adopted prices similar to those of the Vanadium-Alloys company. Demand for high speed tool steels is heavy and shipments are deferred several months.

Builds Addition

The Moltrup Steel Products Co. is erecting an addition to its factory at Beaver Falls, Pa. The building is 60 x 250 feet, and will be of concrete, iron and brick construction. It will be used in the production of crank shafts. A portion of the machinery is being built by the company. Orders have been placed for a number of machine tools including lathes and grinders. The Moltrup company now manufactures cold drawn steel shapes; finished machine keys; machine rack; ground and polished steel plates and discs and other steel specialties.

(*For complete prices see page* 598.)

Sheet Demand

Continues Active—Scarcity of Blue Annealed Reported

Pittsburgh, Sept. 21.—Demand for steel sheet products is considerably heavier than it has been for many months. Automobile builders and manufacturers of electrical equipment are specifying briskly. The downward tendency of the spelter market last week, although not pronounced, was sufficient to develop lower prices for galvanized steel sheets, which have been offered at 3.60c for No. 28 gage the last few days. Open hearth black sheets are being quoted at 2c base, by leading producers, but bessemer black sheets are obtainable at 1.90c. Blue annealed products are firmly held at prevailing prices.

New Eastern High Price

Philadelphia, Sept. 20. — Eastern Pennsylvania sheet makers have sold blue annealed at 1.65c, Pittsburgh, or 1.809c, Philadelphia, for No. 10 gage, a new high price. The orders taken at this figure have been for early delivery, as the seller is in a position to ship in about three weeks. Larger sales have been done at 1.60c, Pittsburgh, so that the eastern market is from 1.60c to 1.65c, Pittsburgh. Specifications against contracts are active and the mills are running full. There has been some inquiry for first quarter, but makers have not been willing to quote for that period.

Blue Annealed Shortage

Cleveland, Sept. 21.—There is some scarcity of blue annealed sheets which is probably due to the high price of sheet bars. The minimum quotation now seems to be 1.50c on No. 10, but there is no profit in selling at this price and paying from $25 to $26 for sheet bars.

Stronger at Cincinnati

Cincinnati, Sept. 21.—Both black and galvanized sheets are a little stronger. Black No. 28 gage are now quoted at 2c, and galvanized No. 28 gage at from 3.50c to 3.75c, both Pittsburgh basis. Sales are not very heavy, but this is due to a large extent to the refusal of mills to sell for extended delivery.

Are Steady at Chicago

Chicago, Sept. 21.—Steel sheets are holding their position with every indication that the first of next month will see quotations considerably higher than at present.

Shortage of semi-finished steel is likely to increase the price of sheet bars by Oct. 1 and some observers believe it will be $5 per ton higher than at present. Under these circumstances the sheet maker must obtain a larger figure for his product. Thus a considerable advance in the quotations on sheets is probable. Black sheets, No. 28 gage, are now selling at 2.14c to 2.19c, Chicago mill, with galvanized, No. 28 gage, obtainable at a minimum of 3.79c, Chicago, and some makers are asking considerably more. The leading independent sheet maker in this territory still remains out of the market.

Tin Plate Quiet

Pittsburgh, Sept. 21.—Despite strength displayed by the sheet bar market, tin plate continues to be offered at comparatively low figures. Consumers still are able to obtain tonnages at 3.10c and reports of that figure being shaded are heard. British restrictions on shipments of tin went into effect yesterday, but it is too early to forecast the outcome of the protective step taken by Great Britain.

Nuts and Bolts

Being Shipped to Far East and to Belligerent Countries

Chicago, Sept. 21.—Makers of bolts and nuts find considerably increased demand for this product and both new business and specifications on existing contracts are largely increased. The recent advance of 5 per cent and the steady advance in the price of raw material probably are having effect on consumers who see the possibility of considerably higher prices in the near future.

Rivet Company Busy

Cleveland, Sept. 21.—The leading rivet manufacturer reports that it is doing very active business at prevailing quotations and will ask 10 cents a hundred pounds more for the last quarter. The consumption of steel by some rivet makers is not, however, apparently as heavy as it was some time ago.

Pittsburgh Plants Busy

Pittsburgh, Sept. 21.—Nut, bolt and rivet makers are driving plants at capacity. Most of them are shipping rather heavy tonnages to South American and far eastern countries and belligerent European nations are buying rather actively. No difficulty has been experienced, manufacturers say, in establishing advanced schedules recently adopted.

The Ross Chain Mfg. Co., Louisville, Ky., has reduced its capital stock from $69,000 to $50,000.

(*For complete prices see page* 598.)

Wire Prices

Are Advanced $2—Much Foreign Business Rejected

New York, Sept. 21.—Wire products generally were advanced $2 a ton, effective Sept. 18, by the American Steel & Wire Co. This places the schedule at 1.60c, Pittsburgh, for plain wire, 1.75c for nails, 1.90c for plain barbed with the galvanizing extra unchanged at 70c per 100 pounds. The entire lists of miscellaneous wire mill products, including cold rolled flats and rods, also were advanced $2 a ton. Rods now are quoted at $30, Pittsburgh. All makers are turning down large lots for export which they are unable to accommodate. The foreign demand still runs heaviest to barbed wire, but there also is a large call for plain wire and for rods. The foreign buyers are willing to close practically as far ahead as the mills will allow them.

Wire Advanced $2

Pittsburgh, Sept. 21.—The American Steel & Wire Co., under date of Sept. 18, advanced wire products $2 a ton; independent concerns adopted new prices yesterday. The following schedule prevails: wire nails, $1.75 per 100 pounds; plain wire, $1.60; galvanized wire, $2.30; polished staples, $1.90; galvanized staples, $2.60; painted barb wire, $1.90; galvanized barb wire, $2.60 per 100 pounds. Galvanized nails were unaffected; 1-inch and longer are held at $1.75 and nails shorter than one inch are commanding $2.25. Tremendous demand for export appears to be responsible for the sharp advance in wire products. The last previous advance was Aug. 30, when galvanized products were advanced $2 a ton; the extra for galvanizing is 70 cents per 100 pounds. Inquiries involving from 50,000 to 80,000 tons of barb wire have been sent out by agents for entente nations.

Scrap is Strong

Cleveland, Sept. 22.—Sentiment is better in the iron and steel scrap market and quotations gradually are stiffening, as sellers hold for higher prices. Buying has been done in good volume by mills in the Cleveland and valley districts, and some fair tonnages of material have been shipped from here to the Pittsburgh district. Mills are accepting material more rapidly than they did recently. Some brokers are predicting the return of $14 and $15 heavy melting steel in the near future. At present the market for this description is $12.50 to $13, gross ton, Cleveland, and $13 to $13.50, gross, valleys.

Shape Prices Advanced

Eastern Mills Boost Quotations $2 Per Ton—Some Fourth Quarter Contracts at 1.40c, Pittsburgh

Philadelphia, Sept. 20. — Eastern Pennsylvania shape makers have advanced their price $2 a ton for current delivery to 1.50c Pittsburgh on 1.659, Philadelphia and are obtaining this figure on some odd lots. Where they can make immediate deliveries from stock, certain makers are asking 1.60c mill. Some additional contracts for fourth quarter have been accepted by eastern makers at 1.40c Pittsburgh and in a few cases, from the very largest buyers, at 1.35c Pittsburgh. No first quarter quotations are being made. The contracts on hand at the present rate of specifications will take up the greater portion of the mill capacities for the year and makers want a higher figure on anything additional they may be able to accommodate. Their schedule of deliveries at present runs from 8 to 10 weeks. With certain works, specifications the past weeks have not been quite so large, but this is welcomed rather than otherwise because of the heavy and active bookings. Fabricated orders are fair, but not heavy. There is continued talk of another 8,000-ton proposition in the ammunition plant line being quietly figured in this district.

New Tonnage Light

New York, Sept. 21.—New tonnage of structural material coming up for action in this territory continues of rather mediocre proportions. Miscellaneous requirements make up a fair total, but there is a lack of large propositions. Railroad work is conspicuously light. Notwithstanding a moderate amount of new work, the pressure upon the mills for plain material is no easier. Deliveries continue well extended and prices are on a firm basis. Leading eastern shape makers are quoting 1.40c, Pittsburgh, or 1.569c, New York, on current delivery, and certain eastern works are holding for 1.50c, Pittsburgh, on such orders. Fabricated prices tend to improve, but the situation presents much irregularity.

Fabricators Busy

Pittsburgh, Sept. 21. — Fabricating shops in the Greater Pittsburgh district are enjoying considerable activity, but additional tonnages will be needed soon to maintain present operating schedules. The American Bridge Co. has taken 1,500 tons for an additon to the B. F. Goodrich Co. plant at Akron, O.; 600 tons for a freight station for the Baltimore & Ohio railroad at Pittsburgh and the DesMoines Bridge & Iron Works will furnish 600 tons for the Bailey high school, this city.

King Bridge Low

Cleveland, Sept. 21.—On the thousand tons of steel for the Union avenue grade crossing elimination, the lowest bidder was the King Bridge Co., at 2.86c per pound, erected. The next bidder was the American Bridge Co., at 2.90c, while the McClintic-Marshall Co. bid 3.57c and the Stroebel Construction Co., 3.62c. The contract undoubtably will be awarded to the King Bridge Co. The Stillman theater, 360 tons, has been awarded to the Massillon Bridge & Structural Co.

Big Apartment

Cincinnati, Sept. 22.—Several hundred tons of structural steel will be needed in the construction of one of the largest apartment buildings in the middle west, which will occupy the block bounded by Plum, Logan, Findlay and Elder streets. It will be five and a half stories high, 100 x 300 feet, and will accommodate 100 families. The cost will be $350,000. Plans are being prepared under the name of W. Cooper Proctor.

Shapes Are Steady

Chicago, Sept. 21.—Structural shapes are firming up considerably in demand, although building operations for the most part are confined to small tonnages. Both shape makers and fabricators find nearly enough to keep them fully occupied and shapes are held firmly at 1.54c, Chicago mill.

Structural contracts placed in the west during the past week do not exceed 600 tons in any instance.

CONTRACTS AWARDED.

Plant for Moline Malleable Iron Co., St. Charles, Ill., 602 tons, to Vierling Steel Works.

Record and office building for Chicago & North-Western Ry. Co., 600 tons, to American Bridge Co.

Webster avenue subway, Chicago & North-Western Ry. Co., 228 tons, to Chicago Bridge & Iron Co.

Pavilion for Presbyterian Hospital, Chicago, 200 tons, to Vierling Steel Works.

Pier No. 30, East river, Brooklyn, 1,000 tons, general contract to Snare & Triest.

Westinghouse, Church, Kerr & Co., mill building for East St. Louis Cotton Oil Co., 175 tons, to American Bridge Co.

Addition to the residence of Cornelius Vanderbilt, Fifth avenue and Fifty-seventh street, 250 tons, to National Bridge Co.

Merric & Pember apartment, Albany, 300 tons, to Levering & Gerrigues.

Industrial building, Curtis Bay, Md., 300 tons, to Dietrich Bros. The Geo. A. Fuller Co. has the general contract.

Arch steel centers for bridge at Manyunk, Pa., for Pennsylvania railroad, 400 tons, to Phoenix Bridge Co.

Extensions to plant of Carpenter Steel Co., Reading, Pa., 150 tons, to the Eastern Steel Co.

Building for American Tube Works, Somerville, Mass., 200 tons, to the New England Structural Co.

Bridge work for the Western Maryland, 500 tons, to the Fort Pitt Bridge Works.

Bridge work for the Southern railway, 400 tons, to an independent shop.

Fink loft building, 318-336 West Thirty-ninth street, New York City, 2,500 tons, erection contract to Post & McCord and fabrication to American Bridge Co.

Building for Consumers' Biscuit Co., Brooklyn, 450 tons, to Milliken Bros., Inc.

Building for the Seneca Falls Mfg. Co., Seneca Falls, N. Y., 400 tons, to John Eichleay, Jr., Co.

Addition to the B. F. Goodrich Co. plant, Akron, O., 1,500 tons, to the American Bridge Co.

Freight station for the Baltimore & Ohio railroad, Pittsburgh, 600 tons, to the American Bridge Co.

Bailey high school building, 600 tons, to the DesMoines Bridge & Iron Works.

Stillman theater, Cleveland, 360 tons, Massillon Bridge & Structural Co.

CONTRACTS PENDING.

Barracks for the navy department at Mare island, 200 tons, bids pending.

First squadron armory, Philadelphia, 600 tons, revised bids being taken.

Bridge at Emerald street, Philadelphia, for the city of Philadelphia, and the Philadelphia & Reading railroad, 500 tons, bids being taken.

Building for the Consolidated Gas Co., Baltimore, 3,000 tons, project being revived.

Bridges for the Virginia railway, 250 tons, bids being taken.

Dormitory for Wellesley College, Wellesley, Mass., 250 tons, bids being taken.

Pier West Twenty-third street, New York, 1,100 tons, bids being taken.

Warehouse, Brooklyn, for Kirkman Soap Co., 1,000 tons, bids being taken.

Gerhard Lang Brewing Co., Buffalo, brew house addition, 300 tons, taking bids.

Jamestown Traction Co., Jamestown, N. Y., new carhouse, 300 tons, bids in.

Frazer & Jones Co. malleable iron works, Syracuse, two buildings, plant additions, 1 story, 250 x 354 feet. Sacet & Parke, Syracuse, architects. To put in foundations this fall, superstructures in the spring.

The Gartland Foundry Co., Toledo, O., is at work erecting a temporary foundry on Delece street to be occupied pending the completion of the permanent building at 1811-21 Starr avenue, which is being constructed at a cost of $30,000. The company will employ in the beginning about 150 men, the number to be increased as the business gets under way. The company, it is stated, has enough orders to keep the factory busy for several months.

(For complete prices see page 598.)

Scrap Market

Shows Some Irregularity, With Transactions Limited

New York, Sept. 21.—Wrought grades of scrap, especially pipe, have developed some easiness as general buying in the old material market in this territory has continued quieter. The highest price now obtainable for pipe seems $14, eastern Pennsylvania, or about $12, New York. New business in all grades has been smaller and the market is moving slowly, but holders of material do not appear apprehensive and still sell sparingly. Cast grades are strong. Heavy melting steel is steady at $15, delivered eastern Pennsylvania. Steel axles for export are bringing high prices and better than $21, seaboard, has been done. Railroad lists in this territory closed out within a few days have brought higher prices than last month.

Demand is Lighter

Philadelphia, Sept. 20.—Easier prices and a lighter demand from consumers have continued in the old material market in this district the past week. Sales are being made more at the minimum than at the maximum figure of price ranges. Heavy melting steel in tonnages holds at $15, delivered, and sales of several thousand tons have been made to the works at this figure within a day or two. Small lots have gone at $14.75, delivered, chiefly to dealers. Sales of No. 1 railroad wrought at $16.50, delivered, and of No. 1 heavy cast at $14.50, delivered, are noted. Low phosphorus scrap remains very strong and sales have been made at $21, eastern Pennsylvania. Steel axles continue in good demand for export and sales have been made at considerably over $20, seaboard. The Philadelphia navy yard is offering about 2,000 tons of mixed scrap.

Some Grades Advanced

Buffalo, Sept. 21.—Dealers report a letup in the buying except old iron axles, old steel axles and low phosphorus steel scrap. In these commodities, prices have been advanced during the week. The acceptance of orders at present prices on the general lines and filling the same from stocks indicate that dealers believe prices will remain at the level reached for at least some time. In some quarters, a break is looked for after the large consumers in the market are covered for their needs.

Strengthens at Pittsburgh

Pittsburgh, Sept. 21.—Market advances registered by the iron and steel market 10 days ago have been maintained, and dealers predict higher figures soon will appear. Specifications for material for shipment to steel and iron melters are increasing in volume, but new buying is not heavy. Low phosphorous scrap is selling at as high as $20 a ton for plate and shape shearings; billet and sheet bar crop ends are being held at about $1 a ton above that figure. Heavy melting steel is selling at a spread from $14.75 to $15.

Steady at Chicago

Chicago, Sept. 21.—Comparatively little activity is being shown in the scrap market in Chicago. Consumers have not yet reached the point where it becomes necessary for them to replenish their stocks and practically the only activity is between brokers obtaining material to fill previous orders and in shipments from this territory to eastern markets, where higher prices are attractive.

Some scrap products are considerably out of line with the ordinary range, due to unusual conditions in the steel market, and ordinary differentials are not applicable to present conditions.

Railroad scrap lists are not many nor heavy, the Chicago, Milwaukee & St. Paul offering 2,100 tons, half of which is railroad wrought, the Chicago & Eastern Illinois 900 tons, and the Burlington 2,500 tons.

Unchanged at Cincinnati

Cincinnati, Sept. 21.—The iron and steel scrap market is stationary. Buying is at a minimum again, as neither rolling mills nor foundries are closing new contracts. Shipments on old contracts to rolling mills are good, but jobbing foundries are not using as much scrap iron as they should. Stove foundries, in most instances, are barely operating. Prices are unchanged on all grades. The best sellers today are heavy melting scrap, No. 1 busheling, No. 1 machine cast and bundled sheet scrap.

Weaker at St. Louis

St. Louis, Sept. 20.—Scrap quotations continue stationary, and while the market has a weaker tone, prices have not receded on any grades. Very little business was done last week, nearly all industries having contracted for their requirements for a considerable period ahead.

Relaying rails as well as rerollers still are scarce, and commanding top prices. The only railroad offering on the market is a small list of 300 tons from the Vandalia.

The La Follette Iron Co., La Follette, Tenn., is contemplating blowing out its stack for relining.

(*For complete prices see page* 598.)

New York Ore

Will be Purchased by Eastern Pennsylvania Company

Cleveland, Sept. 21.—An estern Pennsylvania steel company, which has been figuring on a large tonnage of Lake Superior ore, has decided to place its order with a New York state company from which it can obtain the ore at a considerably lower price. Some ore, usually in 10,000 to 15,000-ton lots, is being sold and one firm has sold about 100,000 tons during the past two weeks. Interest centers, however, in shipment of ore already sold. Grain rates have been advancing rapidly and some shippers of ore are finding difficulty in getting vessel tonnage. Vessels to haul grain are being chartered at 3¼ cents, which is equivalent to $1.20 per ton on ore, but as yet there has been no advance in the ore-carrying charge.

Cast Iron Pipe

Inquiries for Round Tonnages for Export Still Coming

New York, Sept. 21.—While numerous inquiries for cast iron pipe for export to the West Indies and to South American countries particularly continue to come before eastern makers, both through American houses and through native engineers now in this country, action on these is a slow matter. In most cases, these inquiries are preliminary and are to ascertain how and at what terms the requirements of enterprises now being planned can be met in this country. Slowness of communication between the engineers now on the ground here and their principals tends to make the negotiations drag. The pipe called for by these inquiries and pertaining both to active and prospective construction, easily reaches 20,000 tons. The pipe market here on home buying is quiet. Practically no public inquiries are coming out. The United States Cast Iron Pipe & Foundry Co. has taken 5,000 tons of 36 to 48's for the Louisville Water Co., Louisville, Ky. Royersford, Pa., will take bids Sept. 25 on 225 tons of 6 to 20's. Prices are steady at $24 to $25, New York, for 6 to 12's and at $27.50 to $28, New York, for 4's, class B. Smaller pipe is stronger than other sizes because the tonnage is more plentiful.

Cast Pipe is Advanced

Chicago, Sept. 21.—An advance of 50 cents per ton on cast iron pipe is a feature of the week. Four-inch is now quoted at $27, Chicago, and 6-inch and larger at $25, Chicago,

light weight water and gas pipe being $1 per ton above these figures. Considerable routine business is being booked by pipe makers and some municipal lettings are attracting attention. The American Cast Iron Pipe Co. has taken 1,000 tons at Kansas City, Mo. Bids were to be opened Sept. 20 at St. Charles, Ill., for 285 tons and Sept. 23 at Whitehall, Mont., for 150 tons, with alternate bids on steel pipe. Middletown, O., will open bids Sept. 23 on 350 tons.

Railroad Buying

Promises to Improve at an Early Date—Rails Placed

New York, Sept. 21.—Important negotiations for rails against 1916 requirements are going forward between the mills and roads both in the east and in the west. In the east alone, from 75,000 to 100,000 tons are before makers, a large part of which are for the New York Central system. Several other eastern lines are included, one of which usually takes from 20,000 to 30,000 tons. In the west, the Pere Marquette is out for 16,000 tons. The Colorado Fuel & Iron Co. is reported to have booked 35,000 tons from the Santa Fe. Other tonnages are in prospect.

Equipment buying prospects continue to show up more encouragingly and a number of lines are getting ready to be important purchasers in the near future. However, the contracts actually placed still make only a meagre showing. The New York Central lines are reported to have closed for 1,000 steel automobile box cars recently inquired for and it also is reported that the Michigan Central is preparing to buy 2,500 cars. The Norfolk & Western railroad has placed 30 mallet locomotives with the American Locomotive Co.

Track Fastenings Higher

Chicago, Sept. 21.—Steady advance in the prices asked for track fastenings is a result of increased demand on the part of railroads for this material. Large inquiries are current in the market at present for almost all kinds of track equipment and prices have stiffened materially in the past few weeks. Angle bars of standard section are now quoted at 1.50c to 1.75c, Chicago; railroad spikes at 1.65c to 1.75c, Chicago; bolts at 2.10c to 2.25c, Chicago, and tie plates at $30 to $32, Chicago. Indications are that within a few days the maximum figures just mentioned probably will become the minimum as further advances seem imminent.

British Market

Shows Pig Iron Steadier and Finished Lines Strong

Office of *The Iron Trade Review*,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Sept. 11.

Pig iron market is steadying a little. For the past week prices have been almost stationary, both in the midlands and the north of England. Middlesboro continues to suffer from the enormous war obstacles to export. During August that port shipped 43,098 tons of pig iron and 59,627 tons of manufactured iron and steel. For pig iron Italy was the best customer, taking 16,935 tons. All Scotch iron has to be sent away by rail, through certain admiralty restrictions. The total shipments of warrants were 27,000 tons. Warrant stocks decreased duing August 3,000 tons, a figure which suggests that the drastic reduction of output is beginning to tell.

Won't Blow in Stacks.

It seems unlikely that more furnaces will be blown out until the urgency of such a step is much more clearly apparent than at present. The present selling figure at Middlesboro is 65s ($15.60), and the amount in store 142,000 tons. Yesterday's quotations in Birmingham were about 5s ($1.20) to 6s ($1.44) lower than they were a ago, but quotations were decidedly firmer than of late.

The chief element leading to weakness is the practical stoppage of cast pipe orders, and the holding up of contracts for municipalities. Apart from the local propensity for economy, the government will not sanction any large expenditure which is not of life and death importance.

Finished Lines Strong.

No department of finished iron and steel shows any weakness corresponding to that prevailing in pig iron during the last month. At Birmingham yesterday some firms were inclined to ask higher prices for common iron, one quotation being £12 ($57.60), exactly the same as best iron. The steel trade continues active. Yesterday an agent of the French government was in Birmingham with substantial orders to place for war requirements. They were tempting, alike in price and quantity, but the firms to whom they were offered were already heavily committed to the British government and unable to promise the delivery asked for by the end of October. The conditions in America have undoubtedly strengthened the hands of British steel makers. The offers of foreign billets are now few and far between, and the prices are not tempting, especially in view of the depreciation of British currency in America. Importing merchants say that the currency question alone might easily mean 6s ($1.44) added to the price of the American billets by the time they were paid for. British makers hope to have practically complete control of their own market shortly.

Believe Spelter Will Fall.

Spelter has been somewhat easier during the last week or two. Last week it rebounded £10 ($48) per ton up to £75 ($360). Makers of galvanized sheets have disregarded this recurrence of boom tendencies, believing that the fall will continue. However, the market is stagnant, buyers waiting for the easier prices which are expected to ensue when spelter goes still lower.

Spelter Prices

Not Firmly Established, as Buying Has Been Light

New York, Sept. 21.—Forward positions in spelter, which have been neglected recently, now are attracting more attention, especially for export, and some fair tonnages have been closed within a few days at 10c, St. Louis, for prime western for first half of 1916 and at slightly over 10c for first quarter. Some producers quoted today 10c, St. Louis, for first quarter. Producers have not much business on their books after Jan. 1 and apparently are willing to make considerable inducements to obtain some. At the same time, not all makers have been willing as yet to go to 10c, St. Louis, and one seller reports as late as last Friday a first quarter order at 12.50c. St. Louis. Spot spelter prices have been rather difficult to define, as sales have been few because not much metal is available. For spot and September, 13.25c to 13.50c, St. Louis, now is named; for October, 13c to 13.12½c and for November and December, 12.25 to 12.62½c. Brass special for prompt is held at 15.25c, St. Louis, with 15c bid today. The same prices prevail over the balance of the year. Demand is light.

Lead has been in better demand and steady after the reduction to 4.50c, New York, or 4.40c to 4.42½c, St. Louis. Producers are not inclined to make concessions as they feel the bottom has been reached.

Tin shows a moderate amount of buying and is quoted at 33c, New York, for all positions. The market has varied little during the past week.

Copper has shown some fair buying both domestic and foreign on certain days the past week and has been firmer.

(*For complete prices see page* 598.)

Electrolytic has ranged from 17.75c to 18c, delivered 30 days and now stands at 17.87½c to 18c. Some lake copper, probably arsenical has been offered here as low as 17.25c, cash, within the last day or two.

Some domestic antimony made from Alaskan ores has been offered at 26½c, delivered. Some inquiries, which have been out have not materialized into sales and the market is dull. Chinese and Japanese are 28c to 28½c, duty paid.

Dealers are selling small spot lots of No. 1 ingot aluminum at 50c, New York, but find difficulty to restore this metal, as there is none available for early shipment. On carloads the market is nominal at 40c to 45c, delivered.

Lower Rate

On Steel Products from Pittsburgh to Pacific Coast

Pittsburgh, Sept. 22.—The Chicago, Milwaukee & St. Paul railroad has notified traffic managers of Pittsburgh steel companies that it will offer a 55-cent rate on shipments to Pacific coast points, which means that local concerns soon will enjoy the same rate as that prevailing from Chicago for shipment to Pacific coast ports. The Wabash-Pittsburgh Terminal Railroad Co., several weeks ago, announced that it would be willing to offer the 55-cent rate to Pacific coast ports if other carriers would cooperate.

The present rate on steel products to the Pacific coast is 73.9 cents per 100 pounds, which is equivalent to the 55-cent rate from Chicago plus the rate to that city, which is 18.9 cents. The rate from Pittsburgh to the Pacific coast via the Panama canal is 56.9 cents per 100 pounds. Traffic managers say this rate would have to be reduced to about 30 cents per 100 pounds to divert traffic to the rail and water route.

It is understood the Chicago, Milwaukee & St. Paul railroad will adopt the 55-cent rate before the end of this week and it is probable other transcontinental carriers will offer a similar rate at an early date.

Canton Contracts Awarded

Several additional contracts in connection with the building of the blast furnace of the United Furnace Co., Canton, O., have been let. The contracts for steel work have been divided, the trestle work going to the Massillon Bridge & Structural Co. and the power house and boiler house to the Canton Bridge Co. The boilers were awarded to the Babcock & Wilcox Co.

The Ft. Pitt Bridge Co., Pittsburgh, has been awarded the contract for the steel for the addition to the plant of the United Steel Co., Canton. The S. R. Smythe Co., Pittsburgh, has the contract for the open-hearth furnaces, and the Morgan Construction Co. Worcester, Mass., will build the sheet bar mill. The Westinghouse Electric & Mfg. Co. will furnish the electrical equipment.

Old Board is Re-elected

The retiring board of directors of the Thomas Iron Co., Easton Pa., was unanimously re-elected at the annual meeting of the company last Tuesday. R. H. Sweetser was re-elected president and general manager; Edwin Thomas re-elected vice president; Oliver T. Case appointed secretary, and Lawrence K. Diffenderfer appointed treasurer. It was the most harmonious stockholders' meeting held in several years and much satisfaction was expressed over the printed annual report which was sent out before the meeting. The board of directors of the Thomas Iron Co. has authorized the dismantling of old No. 6 furnace at Hokendauqua, Pa. It also has authorized the erection of two brick hot blast stoves at Alburtis.

May Take Over Midvale Company

A report has been current in eastern steel circles that negotiations are being carried on aimed toward a change of ownership in the Midvale Steel Co., Philadelphia. Officers of the Midvale company have declined either to deny or to confirm any of these reports. A syndicate, said to be headed by Wm. A. Read & Co., 32 Nassau street, New York, is reported to be conducting negotiations. If the deal is consummated, according to the gossip the plant will be expanded for the manufacture of munitions for the entente powers. While the Midvale Steel Co. is a large manufacturer of armor plate and explosive shells for the United States government, it has not accepted any business from any of the foreign belligerents. In addition to military and naval supplies, it manufactures high grade steels of various descriptions. The company was incorporated in 1881 and has outstanding $9,750,000 capital stock. Its plant is at Nicetown. Chas. J. Harrah is president.

The general offices of the Alan Wood Iron & Steel Co. and the Upper Merion & Plymouth Railroad Co. will occupy a suite in the new Widener building, Philadelphia, after Sept. 27. At the present time, the offices are located in the Morris building.

Will Make Dyestuffs by New Process

The Pearsite Co., of which Col. H. P. Bope, vice president of the Carnegie Steel Co., is president, Sept. 20 started to make dyestuffs at its new plant at Cannel City, Ky. One furnace was fired and additional furnaces will be put in operation as soon as they are completed. The output of the plant will be sold by F. Bredt & Co., New York.

The company was recently organized with $2,000,000 capital stock to make dyes by a new process which will revolutionize the industry, according to Dr. Thomas H. Norton, a government color expert. Officer of the Pearsite Co. are: President, H. P. Bope; vice president, Arthur L. Pearse, co-inventor of the process; and secretary, Wheeler B. Horner, of Pittsburgh. These officers, with Nathaniel W. Niles, of Boston, compose the board of directors. The company will produce dyes and other by-products from coal. The contract for furnaces for oxidizing the coal was awarded the John F. Casey Co., Pittsburgh. Either five 100-ton furnaces or 10 50-ton furnaces will compose the battery.

Officers of the company express confidence that the government will co-operate in making a success of the dyestuff industry by adopting a tariff high enough to enable makers to sell at a reasonable profit.

Machinists' Strike

Because of a strike of 400 union machinists at the Prentice Bros. plant of the Reed-Prentice Co., the largest machine tool manufacturers in Worcester, Mass., at 10 o'clock Monday morning, the factory was shut down at noon for an indefinite period. At 3 o'clock the same day, about 300 machinists employed at the Gold street plant of the company also struck. The men demand an 8-hour day and 5 cents an hour increase in wages. They have just been granted a bonus ranging from 10 to 20 per cent according to the length of service, which means more money to them than what they ask, but they say they prefer a straight increase rather than a bonus. The company has been operating on a 24-hour basis several months to its fullest capacity, having a year's work ahead, not only war orders, but a large amount of domestic business. It was given notice of the intended strike by the union, but Vice President and General Manager Albert E. Newton said the company could not grant the increase.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

R. W. Gillispie, who, as announced last week, has been appointed general manager of sales of the Pennsylvania Steel Co. to succeed John C. Jay, resigned, entered the employ of the Pennsylvania Steel Co. in 1904 as an apprentice, and the following year was transferred to the New York office and became assistant to Mr. Jay, then New York sales agent, in May, 1906. He succeeded Mr. Jay as district sales manager in the New York office in 1912.

H. C. Elliott, vice president of the

R. W. GILLISPIE

Marshall & Huschart Machinery Co., Chicago, has resigned.

William Holger Hansen, Hartford, Conn., has gone to San Francisco, where he will be assistant to the agent of the Whitney Mfg. Co., Hartford. It is also his honeymoon trip.

J. C. Callery, chief enginer for the Champion Coated Paper Co., Hamilton, O., has been appointed chief examiner of steam enginers for Ohio by Governor Willis.

Ivor M. Williams, for a number of years connected with the Cleveland office of the American Bridge Co., has been placed in charge of the office which has just been opened in Cleveland by the Massillon Bridge & Structural Co., at 612 Marshall building.

Edgar Reed, president of the Reed & Prince Mfg. Co., Worcester, Mass., has returned from a month's pleasure trip to Copenhagen, where he visited the company's Denmark representative.

H. B. Zeller, assistant superintendent of the coke plant of the Republic Iron & Steel Co. at Youngstown, has resigned to become superintendent of the new by-product plant of the Toledo Furnace Co., Toledo, O.

C. J. Hicks, formerly assistant to the president of the International Harvester Co., has been appointed executive assistant to President J. F. Welborn, of the Colorado Fuel & Iron Co. His duties will relate to social and industrial betterment of the company's employes.

C. J. McGregor has been appointed assistant sales agent of the American Steel & Wire Co., Cleveland, to succeed Louis Bloomfield, resigned. Mr. McGregor was for 10 years a salesman for the company in New England, and during the past two years has been connected with the Chicago office.

H. S. Dent, who has been plant superintendent of the Alabama Co. for the past eight years at Ironaton, Ala., has resigned, and on Oct. 1 will take charge of the sales department of the Talladega Foundry & Machine Co., of Talladega, Ala., which is planning to double its capacity in the foundry business and will also add a full line of machinery and mill supplies.

J. D. Mack, professor of civil engineering, college of engineering, University of Wisconsin, Madison, has been appointed state chief engineer by the railway commission of Wisconsin as the first incumbent of the position created by the law of 1915. The salary is $6,000. The state chief engineer has charge of and supervision over all engineering or architectural work performed by or for the state or by or for any of the departments, boards or commissions of the state.

G. D. Bradshaw, steam engineer of Cambria Steel Co., Johnstown, Pa., has tendered his resignation effective Oct. 1 and will engage in business at Pittsburgh as a member of the firm of Andrews-Bradshaw Co. Mr. Bradshaw was affiliated with the Cambria Steel Co. for five years and prior to that time he was employed by the Indiana Steel Co., Gary, Ind., and the Illinois Steel Co., Chicago. The Andrews-Bradshaw Co. will represent several large manufacturers of steam power plant equipment. Mr. Andrews, who will be associated with Mr. Bradshaw, has had considerable experience in the sale of steam specialty equipment.

F. D. Egan, new vice president of the Association of Iron and Steel Electrical Engineers, is steam and electrical engineer for the Pittsburgh Crucible Steel Co. at Midland, Pa., where he has been since 1911. Mr.

F. D. EGAN

Egan became identified with the iron trade at the plant of the Carnegie Steel Co. at Homestead, Pa. Later, he obtained a position with the Westinghouse Electric & Mfg. Co. at East Pittsburgh, Pa., where he remained 18 months. He was assistant chief electrician at the Carrie furnaces of the Carnegie company, during the erection of No. 6 and No. 7 stacks. Eight years ago, he accepted a position as assistant electrical superintendent at the McKeesport plant of the National Tube Co., where he remained until he went to Midland. Mr. Egan took a course at the University of Pittsburgh, entering with the class of 1910. He is a member of the American Iron and Steel Institute and the Engineers' Society of Western Pennsylvania.

Not Encouraging

Is Annual Report of the Colorado Fuel & Iron Co.

The principal points of the annual report of President Welborn, of the Colorado Fuel & Iron Co., are as follows:

"Gross earnings from operation were $16,578,039.76, a reduction of $1,224,985.45, compared with the previous year, all but about $25,000 of which occurred in the iron department. Operating expenses were $14,812,981.35, a decrease of $1,916,273.90, and net earnings from operation were $1,765,058.41, an increase of $691,288.45. The income from sources other than operation was $496,042.63, making the total net income $2,261,101.04. Bond interest, taxes, sinking funds and other charges against income amounted to $2,595,762.53, resulting in a deficit of $334,661.49, as against a deficit of $905,968.43 in the previous year.

"The reduction in sales was due to a curtailment in the consumption of coal in all of that territory supplied from Colorado, and to lighter purchases of steel by railroads.

"There is little promise of improvement in buying by railroads during the current fiscal year, and we do not anticipate a volume of rail business that will keep the rail mill operating to more than 50 per cent of its capacity.

"The summer demand for coal has not been up to normal, and while some improvement is anticipated in the near future, it is not believed that the business will be such as to enable us to work all of our mines to their capacity, even during the winter months.

"During the period of reduced consumption of coal, extending now over two years, development of new coal properties in Colorado has continued, with the result that the productive capacity of developed mines producing domestic coal in the state is at least twice the present demand and far in excess of the prospective demand for some years.

"Our coal properties have been kept in good physical condition and are able to respond to whatever demand may develop, though with the increase in the number of mines operated by others, our participation in the business offered will naturally be on a reduced basis.

"A plan of co-operation between the company and its employes, providing for the adjustment of differences and the consideration of other matters of common interest, through representatives, selected by the workmen, has been inaugurated at the coal mines. In its formative state this plan has proven to be mutually beneficial, and its further development is anticipated in the near future.

"Continued attention has been given to matters affecting the working and living conditions of the employes. Additional safety devices have been installed, and constant vigilance is being exercised to prevent accidents. Many new houses of modern type have been built, and old houses repaired and repainted as needed."

PRODUCTION OF COLORADO FUEL & IRON CO. IN TONS OF 2,000 POUNDS

	Year ended June 30,1915.	Year ended June 30, 1914.	Decrease.
Iron Ore Mined	441,026	614,039	173,013
Limestone Quarried	344,033	376,226	32,193
Pig Iron Produced	286,661	268,883	*17,778
Coal Mined:			
Used in Making Coke 921,016			
Used at Company Plants 561,775			
Commercial Sales 846,278			
	2,329,069	2,428,992	99,923
Coke Manufactured	520,261	535,274	15,013
Finished Iron and Steel	324,600	352,929	28,329

*Increase.

Tube Company

Will Double Capacity of Plant at Ellwood City, Pa.

The Shelby Steel Tube Co., Pittsburgh, has completed plans for numerous extensions and additions to its works at Ellwood City, Pa., which will double capacity of the plant. An electrically-driven continuous bar mill will be installed for rolling various sizes of blooms into rounds; the mill will be equipped with continuous heating furnaces, hot saws, etc., and will provide a capacity of 175,000 tons of rounds annually. Two electrically-driven piercing mills, with auxiliary rolling mills, heating furnaces and finishing mills, also will be installed, furnishing an annual capacity of 60,000 tons of finished tubes, ranging from 2 inches to 8 inches, inclusive. Additions to the power plant will include: one 1,500-kilowatt low-pressure turbine-driven generator; one 2,500-kilowatt high-pressure turbine-driven generator and one 1,600-horsepower fly wheel balancer set.

An 80 x 448-foot extension will be made to the main mill building, and the following new buildings will be erected: bar mill, 60 x 348 feet; chipping shed, 70 x 90 feet; motor shed, 28 x 180 feet; gas producer house, 20 x 96 feet; piercing and hot mill building, 240 x 640 feet.

Work on the foundations of the buildings had been started, and much of the construction work will be completed before Dec. 1.

The new by-product coke oven addition, consisting of 75 ovens, being erected by the Republic Iron & Steel Co., Youngstown, will be completed about Nov. 1.

Higher Wages

And Other Things Demanded by Some Westinghouse Employes

A number of members of labor organizations employed by the Westinghouse Electric & Mfg. Co., Pittsburgh, Pa., have asked officials of the company to grant among other things, a 20-per cent increase in wages and an eight-hour work day. Demands were submitted by officials of the American Federation of Labor, the International Brotherhood of Electrical Workers and the International Association of Machinists.

Demands made by Westinghouse employes are:

Reinstatement of A. T. McNamara, machinist, discharged when he became active in forming a union.

Establishing an eight-hour day at the plant.

Twenty per cent increase in wages.

Payment of overtime at the rate of time and one-half pay.

Recognition of the union.

Several weeks ago the American Federation of Labor launched a movement to organize Westinghouse employes. General Organizer John J. Lewis, of the American Federation of Labor, A. W. McIntyre, representing the International Brotherhood of Electrical Workers, and P. J. Kelly, representing the International Association of Machinists, notified E. M. Herr, president of the Westinghouse company, of demands of the employes.

Labor leaders state that from 20,000 to 25,000 employes at the Westinghouse works are engaged in the manufacture of war munitions for the allies. Recently a union formed among the Westinghouse employes, affiliated with the American Federation of Labor. It is understood not more than 100 active men belong to the union. Organized employes will meet Thursday night, following expiration of the time set for President Herr's reply. President Herr is said to have peremptorily refused to concede the eight-hour day.

The Laporte Radiator Co., Laporte, Ind., has been dissolved.

Heavy Guns

Needed by England—Canadians Not Equipped to Make Them

Toronto, Sept. 20.—An important conference with regard to the giving out of extensive orders for war munitions was held at Ottawa by Premier Sir Robert Borden and Gen. Sir Sam Hughes, minister of militia, and a large number of representatives of the manufacturing, banking and railway interests. The premier, who has recently returned from England where he conferred with the authorities of the British war office with a view of securing for Canadian manufacturers a larger share of war orders, stated that the British government would take all the munitions that Canada was prepared to furnish. The requirements, as presented to the meeting by General Mahan, the expert who accompanied D. A. Thomas on his recent Canadian tour, included from 2,000 to 3,000 heavy guns of various calibres, to be delivered within two years. He proposed that the different parts should be manufactured at plants throughout Canada and the assembling done at some central point. Several of the leading manufacturers present stated that machine shops and factories were not at present equipped with facilities for turning out gun parts. As the financing of the undertaking is an important factor of the situation, the bankers as well as the manufacturers took part in the discussion. Among the proposals considered were the operation of the government shops at Quebec and Sorel and the taking over of the Angus shops of the Canadian Pacific railway at Montreal for the making of heavy ordnance. The whole matter was finally referred to a committee under the chairmanship of Sir John Gibson, including in addition to the members of the shell committee, Col. Frederic Nicholls, Toronto; John Robb, Grand Trunk railway; Hector McInnis, Halifax; Col. F. L. Wanklyn, Montreal; Sir Lyman M. Jones, Toronto; Sir William Mackenzie, Toronto; Senator Edwards, Ottawa; R. W. Blackwell, Montreal; James Young, Dundas, Ont.; George Burn, Ottawa; J. Chaplin, St. Catharines, Ont.; and F. P. Jones, Montreal. The committee will consider the whole question as to the feasibility of the manufacture of heavy guns in Canada, and suggest methods of organization and the distribution of orders in a report shortly to be submitted to the government.

In view of the unsatisfactory results of the attempt to undertake the shell manufacturing industry, owing to the lack of proper organization, the delays in delivery and the uncertainty as to orders, there does not appear much room for optimism regarding this proposed new departure, especially as it is announced that the orders from the British war office will be merely of a tentative character. Much, however, will depend on the action of the government in seeing that a proper assembling plant is provided and the requisite financial aid extended to manufacturers to encourage them to procure the needed equipment.

Pittsburgh Foundrymen's Association

The September meeting of the Pittsburgh Foundrymen's Association held at the Fort Pitt Hotel in Pittsburgh Monday evening, Sept. 20, was addressed by John W. Howard, casualty manager of Edwards, George & Co., on workmens' compensation.

The speaker referred briefly to the history of compensation and to the popular demand for it as developed in the last few years. He illustrated the proposition by assuming a specific case and then applied the compensation proposition to each of the four methods from which the employer is permitted to select in providing it. Mr. Howard referred particularly to the formation of new stock companies for the purpose of providing compensation.

A. O. Backert, editor of *The Foundry*, told about the elaborate arrangements for the convention of the American Foundrymen's Association at Atlantic City. A large delegation from Pittsburgh will be present.

Alloys Advanced

Pittsburgh, Sept. 22. (By wire.)—All grades of bessemer ferro-silicon have been advanced 50 cents a ton for shipment the remainder of the year. Ten to 11 per cent now is quoted at $20.50, furnace. Silvery iron has been put up in price 50 cents a ton and dealers now are asking $17 for 7 to 8 per cent silicon. Both bessemer ferro-silicon and silveries irons are held at 50 cents above prevailing prices for first half delivery.

Will Go Ahead

New York, Sept. 22. (By wire.)—The report that the Steel Corporation will not carry out the Donara spelter plant at present is officially denied. The new plant is well advanced and will be producing in December.

The Warner Iron Co., Nashville, Tenn., will blow in its stack at Cumberland Furnace, Tenn., some time this week.

More Activity

In the Rail Market—Figuring on Large Tonnage

New York, Sept. 22. (By wire.)—Rail buying is growing more active. The Erie has placed 20,000 tons for next year with the Illinois Steel Co. The New York Central is closing the final details for a large tonnage which probably will be about 100,000 tons. The Southern railway is figuring on 20,000 tons for next year. Other southern and western roads are in the market.

Further first quarter contracting for the domestic trade is being done at 1.40c for plates, shapes and bars, and a heavy tonnage now is being booked by some producers.

The Steel Corporation's steel operations remain practically full or around 95 per cent of ingot capacity.

Car Inquiry Improves

New York, Sept. 22. (By wire.)—Car inquiries are better and 5,000 are now actually pending with promising reports of others to follow. The Illinois Central is now out for 1,000 refrigerators and the Central Georgia for 500 box and 500 fruit cars. The Erie asks for 200 furniture cars. The Baltimore & Ohio inquires for 500 and Moody & Co. 500 mine cars.

Opening Deferred

Washington, Sept. 22. (By wire.)—The opening of bids on plates, shapes, bars and rivets by the bureau of supplies and accounts, navy department, which was to have taken place yesterday, was postponed till next Tuesday. The material to go into the stock involves about 11,000 tons altogether. Of this quantity, a little more than 8,000 tons are plates.

Awarded Koppers.—The Koppers Co. has been given the contract for building the foundation for the new blast furnace plant of the United Furnace Co., Canton, O. About 2,000 tons of reinforcing bars will be required. The Koppers Co. took the contract on account of having the foundation to build for the by-product plant of the furnace company.

Edgar V. Hazard, president of the Whitman Foundry Co., Whitman, Mass., died suddenly in his office Sept. 15, from heart failure, aged 63. He was one of the best known foundrymen of New England and was for 15 years connected with the Becker Milling Machine Co., Hyde Park, Mass.

How to Select Your Prime Mover

Practical Hints Covering Methods of Figuring the Cost of Power Based on Accurate Data and Present Coal Prices—Steam Turbines, Gas and Diesel Engines Compared

BY GUSTAV FISK

THE STEAM turbine, the gas engine and the diesel engine all reached a state of practical usefulness by the end of the past century. After a period of unusually rapid development they are today sharing the field of heat conversion to a great extent with the reciprocating steam engine. Due to the low coal prices in the United States and England, the introduction of the steam turbine has been particularly rapid in these two countries, while the European continent more readily adopted the gas engine.

Considering the high state of development already attained by the steam turbine, any further radical progress can hardly be expected. Improvements in details and a certain increase in thermal efficiency may, however, be looked for. The progress in gas engine construction must also be considered as more or less finished. The tendency nowadays is chiefly to increase the capacity of the engines without increasing their size, thus decreasing the first cost, the space required and possibly also the operating expense per unit of power. The diesel engine is still in a stage of rapid development.

The technical and economic properties of the various prime movers are naturally of vital importance to power plants striving for economy, reliability and independence. As compared to the internal combustion engines, the steam turbine has the following merits: Unlimited capacity per unit; low first cost per installed horsepower; wide margin for overloads; simplicity of operation; small increase in heat consumption per horsepower for varying load or partial load; and the possibility of using any kind of fuel under the boilers. The disadvantages of the steam turbine are as follows: Considerable dependence of heat consumption per horsepower on the care of attendants; inconveniences of boiler operation, such as cleaning, inspection, removal of ashes, smoke troubles and heat losses in changing boilers; and the large quantity of cooling water required for condensation.

The internal combustion engines, on the other hand, have the following advantages: Considerably better thermal efficiency than steam turbine plants; immediate readiness for operation; no boiler operation; and small consumption of cooling water. Practically the only disadvantages of the combustion engines are the greater requirements for the foundations and the limited size of the units now available.

Table I.

HEAT UTILIZATION AND FUEL CONSUMPTION OF BOILERS

Fuel.	Heat value per lb. and per cu. ft. B. T. U.	Heat utilization including economizer per cent.	Heat consumed per lb. steam B. T. U.	Steam produced per 1,000 lbs. and per 1,000 cu. ft. pounds.	Fuel consumed per gross ton steam lbs. and cu. ft.
Coal.....	10,500			5,950	376
	12,500	75	1,765	7,080	325
	14,500			8,210	273
Coke oven gas	500	65	2,040	245	9,140
Blast furnace gas	100	55	2,410	41.5	54,000

The heat consumption of steam turbines, gas and diesel engines at full load and partial loads is shown in Fig. 1. The turbine is assumed to operate with admission steam at 176 pounds per square inch gage pressure and 617 degrees Fahr. and with cooling water at 59 degrees Fahr. Considering these working con-

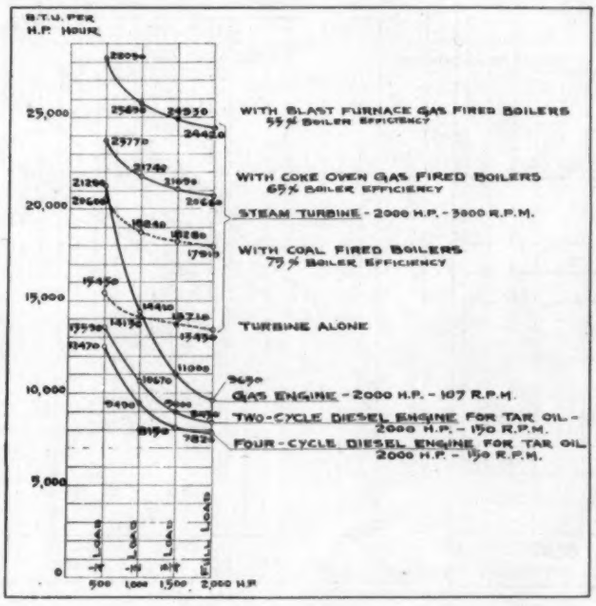

B.T.U. PER H.P. HOUR
25,000
20,000
15,000
10,000
5,000
0
WITH BLAST FURNACE GAS FIRED BOILERS 55% BOILER EFFICIENCY
WITH COKE OVEN GAS FIRED BOILERS 65% BOILER EFFICIENCY
STEAM TURBINE - 2000 H.P. - 3600 R.P.M.
WITH COAL FIRED BOILERS 75% BOILER EFFICIENCY
TURBINE ALONE
GAS ENGINE - 2000 H.P. - 107 R.P.M.
TWO-CYCLE DIESEL ENGINE FOR TAR OIL - 2000 H.P. - 150 R.P.M.
FOUR-CYCLE DIESEL ENGINE FOR TAR OIL 2000 H.P. - 150 R.P.M.
FULL LOAD
500 1,000 1,500 2,000 H.P.

FIG. 1—HEAT CONSUMPTION OF STEAM TURBINES, GAS AND DIESEL ENGINES FOR ONE HORSE-POWER-HOUR AT VARIOUS LOADS

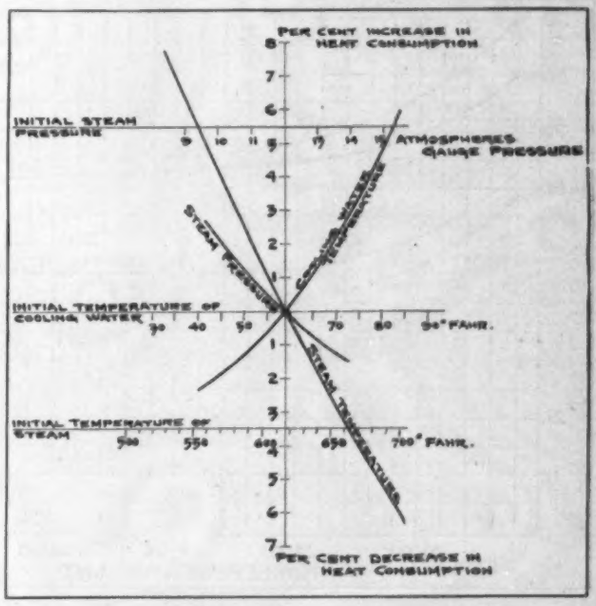


FIG. 2 — DIAGRAM SHOWING THE INFLUENCE OF STEAM PRESSURE, STEAM TEMPERATURE AND COOLING WATER TEMPERATURE ON THE HEAT CONSUMPTION OF STEAM TURBINES

ditions as normal the greater or smaller heat consumption for other conditions can be determined by aid of the diagram, Fig. 2, which is self-explanatory. As seen from the latter, the temperatures of the steam and of the cooling water affect the heat consumption very considerably whereas the steam pressure is by no means so important a factor.

The values given in Figs. 1 and 2 for the heat consumption of the steam turbine and the combustion engines are based on data published by the chief engineer of the Augsburg - Nurnberg Machine Co., Germany, and apply to 2,000-horsepower machines of latest design. This firm has been manufacturing steam turbines, gas and diesel engines in great quantities and is on that account not likely to be biased as regards comparisons. The prevailing conditions in iron and steel works usually call for a power plant using surplus blast furnace and coke oven gases for electric power generation, with steam turbines or gas engines as prime movers. Any additional power required must be supplied with the least possible fuel consumption, and the diesel engine may then in certain cases prove advantageous due to its immediate readiness for operation or as a consumer of available tar oil or tar. The total power cost is made up of interest and depreciation charges, operating expenses, and the cost of the fuel The interest and depreciation charges vary with the cost and the life of the power plant. In addition to conditions of market and locality, the cost depends on the size of the plant and on the selection of the units. In the case of steam power, the number, size and type of

Table II.

HEAT COSTS IN IRON AND STEEL PLANTS

Prime Mover.	Heat cost of steam, cents, gross ton.	Value of 1,000 cu. ft. Blast furnace gas with 100 B. T. U. per cu. ft. cents.	Value of 1,000 cu. ft. Coke oven gas with 500 B. T. U. per cu. ft. cents.	Price per 100,000 B. T. U. Coal, cents.	Price per 100,000 B. T. U. Blast furnace gas, cents.	Price per 100,000 B. T. U. Coke oven gas, cents.	Thermal efficiency at full load, per cent. Coal.	Thermal efficiency at full load, per cent. Blast furnace gas.	Thermal efficiency at full load, per cent. Coke oven gas.	Cost of heat per 100,000 B. T. U. converted into work.* cents.	Cost of fuel for one H. P. hour at full load.** cents.
Condensing steam turbine	15	0.278	1.64	0.380	0.278	0.328	14.2	10.4	12.3	2.53	0.0645
	25	0.463	2.73	0.633	0.463	0.547	to	to	to	4.22	0.1074
	35	0.648	3.83	0.886	0.648	0.766	15.8	11.6	13.7	5.91	0.1504
							Average				
	45	0.833	4.92	1.140	0.833	0.985	15.0	11.0	13.0	7.60	0.1934
										Blast furnace gas.	Coke oven gas.	Blast furnace gas.	Coke oven gas.
Gas engine	..	0.278	1.64	.....	0.278	0.328	....	26.5	26.5	1.05	1.24	0.0267	0.0315
	..	0.463	2.73	.....	0.463	0.547	....	....	....	1.75	2.06	0.0445	0.0525
	..	0.648	3.83	.....	0.648	0.766	....	....	....	2.45	2.89	0.0624	0.0735
	..	0.833	4.92	.....	0.833	0.985	....	....	....	3.15	3.71	0.0802	0.0945

*Cost of heat per 100,000 B. T. U. converted into work $= \frac{\text{Price per 100,000 B. T. U.}}{\text{Thermal efficiency}}$

**Cost of heat for one H. P. hour at full load $= \frac{\text{Price per 100,000 B. T. U.}}{\text{Thermal efficiency}} \times \frac{2{,}545}{100{,}000}$

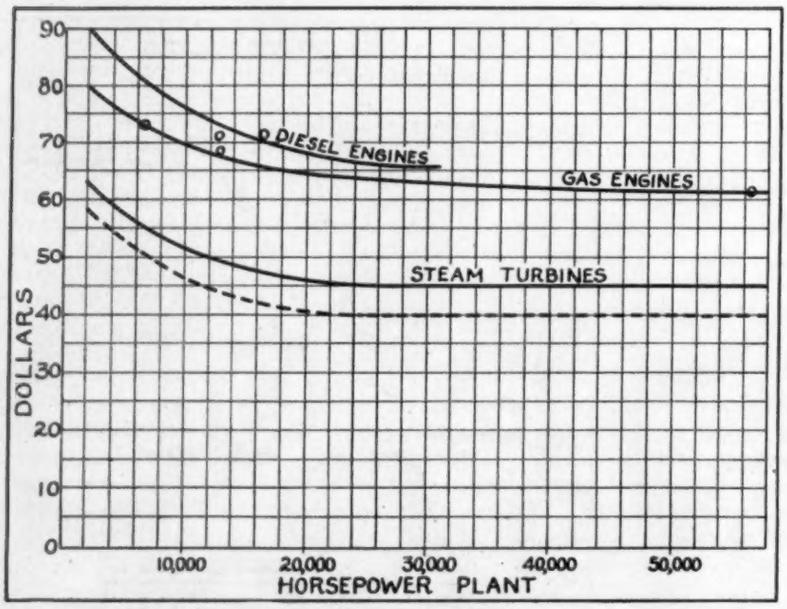


FIG. 3—COST OF POWER PLANTS IN DOLLARS PER INSTALLED BRAKE HORSEPOWER, MAXIMUM CONTINUOUS RATING

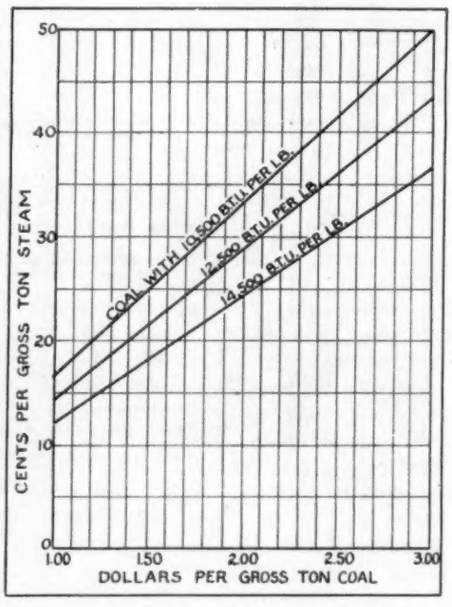


FIG. 4—HEAT COST OF STEAM FOR VARIOUS PRICES AND HEAT VALUE OF COAL

boilers and turbines, the speed of the turbines, and the kind of current generated is of importance. In the case of gas or diesel engines the cost is affected by the number and size of the units, and for the latter, also by the type of the engines, whether they are single or double acting, vertical or horizontal, two or four cycle, and by the number of cylinders in each unit. The cost of power plants per installed horsepower is show in Fig. 3. The power plant costs include the gas cleaning plant in the case of gas engines and the boiler plant in the case of steam turbines but do not include sub-station equipment, storage batteries, transformers and rotary converters, or switchboards for the appliances; nor the cost of real estate and water supply. The full drawn curves in Fig. 3 represent probable average figures for new plants in the United States. In case of steam turbine and gas engine plants they are estimated on the basis of actual costs of existing plants. The small circles shown in Fig. 3 indicate actual costs of gas engine plants, as given in an article by Heinrich J. Freyn in *The Iron Trade Review*, May 29, 1913. The estimated cost of diesel engine plants in the United States has been proportioned to the cost of gas engine plants according to the relative costs of such plants in Germany.

In comparison with power plant costs in Germany the estimated American costs for the turbine plants are proportionally higher than those for the gas engine plants. If the ratios of costs of turbine and gas engine plants in the United States are assumed to be the same as the ratios of these costs in Germany and the estimated American costs of gas engine plants are assumed to represent correct averages, then the average costs of steam turbine plants in the United States would be represented by the dotted curve in Fig 3.

In comparative calculations, the rate of depreciation for internal combustion engines is often put at a higher figure than for steam turbines, but apparently without any good reason. At 6 per cent interest and assuming 7 per cent for depreciation an installation will be paid for in about 10 years. This does not mean that the equipment is liable to be worn out at the end of 10 years, but that it might be found economical to replace it by the end of that period due to technical progress in the meantime. The influence of interest and depreciation charges on the cost of power is predominant at high cost of plant, low price of heat, and small use factors. For auxiliary drive and reserve, therefore, the steam turbine, being the cheapest, is the most suitable except when immediate readiness for operation is essential. Operating expenses are made up of the following items: Labor, repairs and maintenance, lubricants, water, and miscellaneous expenses. In small plants the operating expenses for steam turbines and combustion engines run about the same. The cost of boiler operation for the turbines is offset by the greater cost of lubricants and repairs for the internal combustion engines. In the case of large plants, however, the steam turbine operation appears to be very much the cheaper. Apart from local conditions, the operating ex-

Table III.

DATA SHEET FOR BLAST FURNACE GAS POWER PLANTS

Item.	Description.	Steam turbine plant.	Gas engine plant.
1.	Plant cap'y. B. H. P. max. con. rating	15,000	15,000
2.	Plant capy. K. W. max. con. rating at 92% generator efficiency	10,300	10,300
3.	Plant cap'y. in millions B. H. P. hrs. per year at max. con. rating	131.4	131.4
4.	Cost of plant per installed B. H. P. max. con. rating	$ 48.00	$ 66.00
5.	Total cost of plant	720,000.	990,000.
6.	Interest and depreciation at 13%, per year	93,600.	128,700.
7.	Operating expenses, per B. H. P. cap. at 65% use factor, per year	2.80	3.70
8.	Operating expenses per B. H. P. cap. at 40% use factor, per year	2.35	3.05
9.	Total operating expenses at 65% use factor, per year.	42,000.	55,500.
10.	Total operating expenses at 40% use factor, per year.	35,250.	45,750.
11.	Heat consumption per B. H. P. hour at full load B. T. U.	23,140.	9,600.
12.	Heat consumption per K. W. hour at full load B. T. U.	33,700.	13,980.
13.	Heat consumption per B. H. P. hour at half load B. T. U.	24,340.	14,340.
14.	Heat consumption per K. W. hour at half load B. T. U.	35,450.	20,880.
15.	Increase in heat consumption at half load, per cent.	5.20	49.33
	Cost of fuel per B. H. P. hour at full load:		
16.	With heat cost of steam at 15c per gross ton, cents.	0.0645	0.0267
17.	With heat cost of steam at 45c per gross ton, cents.	0.1934	0.0802
	Total cost of fuel at 100% use factor:		
18.	With heat cost of steam at 15c per gross ton, per year.	$ 84,710.	$ 35,110.
19.	With heat cost of steam at 45c per gross ton, per year.	254,130.	105,340.
	Total cost of fuel at 10% use factor:		
20.	With heat cost of steam at 15c per gross ton, per year.	8,910.	5,240.
21.	With heat cost of steam at 45c per gross ton, per year.	26,730.	15,730.

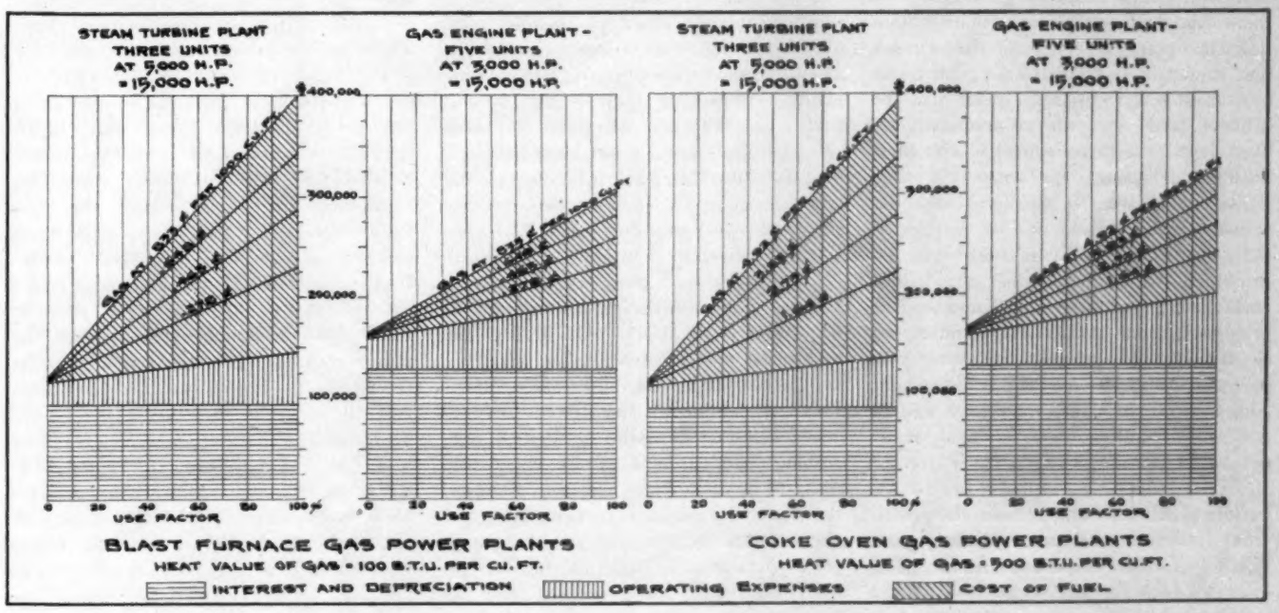


FIG. 5—YEARLY POWER COSTS IN IRON AND STEEL PLANTS

penses vary not only with the size of the plant but also with the use factor. The latter represents the ratio of the actual yearly output of energy to the total energy that would be produced in 365, 24-hour days or 8,760 hours, with the prime movers running constantly at full load. In iron and steel plants the use factor varies from 32 to 72 per cent. It usually runs from 40 to 65 per cent and the average is probably about 50 per cent. For a medium-size plant the yearly operating expenses with use factors of 40 to 65 per cent should run about $2.25 to $2.70 per installed brake-horsepower for steam turbines and $3.05 to $3.70 for gas engines, the expenses increasing with the use factor. These figures are based on cost data covering actual operation of several American plants. The cost of fuel depends on the thermal efficiency, and on the use factor. To ascertain the price of heat, a valuation of available fuels becomes necessary. The writer believes the value of coke oven and blast furnace gases should not be based on the number of B. T. U. they contain. The value of a certain quantity of gas should be computed as equal to the value of the coal required to produce the same quantity of steam as could be generated with that certain quantity of gas. This valuation, however, can only be used under the supposition that all available coke oven and blast furnace gases can be utilized, as is the case at practically all blast furnace and coke plants with steel works and rolling mills attached.

Table IV.

DATA SHEET FOR COKE OVEN GAS POWER PLANTS.

Item.	Description.	Steam turbine plant.	Gas engine plant.
1.	Plant cap'y. B. H. P. max. con. rating	15,000	15,000
2.	Plant capy. K. W. max. con. rating at 92% generator efficiency	10,300	10,300
3.	Plant cap'y. in millions B. H. P. hrs. per year at max. con. rating	131.4	131.4
4.	Cost of plant per installed B. H. P. max. con. rating	$ 45.00	$ 66.00
5.	Total cost of plant	675,000.	990,000.
6.	Interest and depreciation at 15%, per year	87,750.	128,700.
7.	Operating expenses per B. H. P. cap. at 65% use factor, per year	2.70	3.70
8.	Operating expenses per B. H. P. cap. at 40% use factor, per year	2.25	3.05
9.	Total operating expenses at 65% use factor, per year	40,500.	55,500.
10.	Total operating expenses at 40% use factor, per year	33,750.	45,750.
11.	Heat consumption per B. H. P. hour at full load B. T. U.	19,580.	9,600.
12.	Heat consumption per K. W. hour at full load B. T. U.	28,510.	13,980.
13.	Heat consumption per B. H. P. hour at half load B. T. U.	20,600.	14,340.
14.	Heat consumption per K. W. hour at full load B. T. U.	30,000.	20.880.
15.	Increase in heat consumption at half load, per cent	5.23	49.33
	Cost of fuel per B. H. P. hour at full load:		
16.	With heat cost of steam at 15c per gross ton, cents	0.0645	0.0315
17.	With heat cost of steam at 45c per gross ton, cents	0.1934	0.0945
	Total cost of fuel at 100% use factor:		
18.	With heat cost of steam at 15c per gross ton, per year	$ 84,710.	$ 41,390.
19.	With heat cost of steam at 45c per gross ton, per year	254,130.	124,170.
	Total cost of fuel at 10% use factor:		
20.	With heat cost of steam at 15c per gross ton, per year	8,920.	6,180.
21.	With heat cost of steam at 45c per gross ton, per year	26,750.	18,540.

The quantities of various fuels consumed for the production of one gross ton of steam is shown in Table 1, by aid of which the relative values of various fuels can be determined. Knowing the price of coal and the number of B. T. U. it contains, the heat cost per ton of steam is readily found by Fig. 4, in which values have been figured for a heat utilization from coal of 75 per cent. If the heat cost per ton of steam is divided by the quantities of the various fuels consumed, then the quotients represent the corresponding unit values of the respective fuels. The prices of heat per 100,000 B. T. U., based on these unit values and corresponding to various heat costs of steam, are given in Table II.

Using the figures for heat consumption of steam turbines given in Fig. 1, and assuming the efficiencies of coal, coke oven gas and blast furnace gas fired boilers as 75, 65 and 55 per cent respectively, we can determine values for the heat consumption of steam turbine plants, these values being shown in Fig. 1. Due to the usually unfavorable operating conditions for power plants serving the iron and steel industry, the efficiencies of the turbine plants have not been put at the best figures. But the heat consumption of the combustion engines, as shown in Fig. 1, is also represented by moderate values.

It is probably safe to assume the thermal efficiencies of steam turbine plants at full load as 15, 13 and 11 per cent respectively when using coal, coke oven gas and blast furnace gas fuels. The thermal efficiency of gas engine plants at full load may be put at 26.5 per cent. We then determine the cost of fuel per horsepower-hour at full load as shown in Table II. For partial loads the cost of fuel increases in the same ratio as the figures for heat consumption given in Fig. 1.

For all practical purposes the cost of fuel at various use factors may be determined as follows: At 100 per cent use factor, use the figures for heat consumption at full load, at 10 per cent use factor, the figures at half load, and for other use factors assume the heat consumption per unit of power in proportion to these figures. The influence of the fuel cost on the cost of power is predominant at low cost of plant, high price of heat, and high use factors.

By means of the foregoing data we are in position to estimate the cost of energy from a proposed power plant, and determine which is the most economical prime mover for any ordinary individual case, by a comparative cost calculation. The data sheets, Tables III and IV, and the diagram, Fig. 5, show the results of such a calculation carried out for a steam turbine versus a gas engine plant, each of 15,000 horsepower, with blast furnace and coke oven gases at various prices for fuel. The yearly interest and depreciation charges, the operating expenses and the cost of fuel, as per Tables III and IV, are graphically represented in Fig. 5. The aggregate of these costs represents the yearly power cost, which can thus be read from Fig. 5. Assume the price of coal with 12,500 B. T. U. per pound, to be $2.10 per gross ton in a certain locality. We then find the heat cost of steam for this locality from Fig. 4 to be about 30 cents per gross ton. Corresponding to this heat cost of steam the value of 1,000 cubic feet of gas furnace gas is found from Table II to be half way between 0.463 and 0.648 cent. Assuming a use factor of say 50 per cent and locating a point in Fig. 5 corresponding to said gas price and use factor, we find the total yearly power cost to run about $217,000 for the steam turbine as well as for the gas engine plant. Thus, at the conditions considered the power costs reach an equilibrium. If the coal is more than $2.10 per gross ton, or if it contains less than 12,500 B. T. U. per pound, or if the use factor is above 50 per cent, other conditions remaining unchanged, then the gas engine plant is the more economical installation. On the other hand, if the coal is less than $2.10, or contains more than 12,500 B. T. U., or if the use factor runs under 50 per cent, then the steam turbine plant has the advantage. At 10,500 B. T. U. per pound of coal and 50 per cent use factor the equilibrium in power cost is reached at about $1.80 per ton coal, and for 14,500 B. T. U. at $2.50. With coke oven gas for fuel, the equilibrium for coal of 12,500 B. T. U. and at 50 per cent use factor is reached at a coal price of about $2.80 per ton. The yearly power costs for

(*Continued on page* 598b.)

Purchased Power for the Steel Mill

Economic Advantages of Central Station Current Over Individual Plants Are Now Being Recognized by the Steel Industry

BY C. S. LANKTON

THE extremely rapid advancement of the central station is in reality the advancement in design of the turbine and the turbo-generator. When the turbine first made its appearance steel manufacturers eagerly sought information concerning its possibilities. The recent advancement in design of the turbine and its companion, the turbo-generator, has been phenomenal.

The possibilities of purchased power mean nothing to the steel plant located outside of the range of the large central station. Railroads can carry coal across the continent, but large quantities of power have, at the present time, only a limited radius of transmission. Large central stations are also sparingly located. Cheap coal, or an abundant water supply, accompanied by a good market for power are fostering elements to the central station. There are a few steel plants that have such a demand for power that their generating units and power houses rival in size and capacity the central station. This article does not attempt to include these plants within its scope.

The recent development of the central station is the best argument for its usefulness. Statistics covering a period of five years taken from the census report for the years 1907 to 1912, show that during this five year period the total kilowatt capacity in generating apparatus has increased 70 per cent. The installation of alternating current apparatus has increased over 100 per cent. The capacity of individual machines has been raised 90 per cent, while the number of machines in use has decreased 7 per cent. These figures plainly show that old machines of small capacity have been discarded and new and larger capacity machines installed. The output of central stations has increased 100 per cent in this same period of time, while the capitalization of central stations has only increased 52.9 per cent.

Why Central Stations Grow

These facts are very significant as relating to the advancement of central station economy. The total capitalization of commercial electric companies at the close of 1912 was given at $2,052,494,697. These statistics include hydro-electric plants as well as steam plants and are for commercial electric companies but exclude municipal companies. They clearly show the tendency and drift of the times as regards central stations. The expansion of central stations has taken place in unison with the design and perfection of the units that go to make up their structure. The largest unit of five years ago has now been surpassed by one twice as large, as far as capacity goes, but several times smaller when floor space is considered. Higher speeds, better mechanical designs, better ventilation, artificial cooling and many other details are responsible for this advancement. Even with the marked progress of the past, intimations of still greater things for the future are hinted at and the time may come when the 50,000 kilowatt machine may take away the honors that the 30,000 kilowatt machine now enjoys. So it would seem that possibilities are ever increasing in favor of the central station.

Sizes of Installations Vary

In order to secure a comprehensive idea of the relative capacity of the generating plant required by the average steel company, the writer made some effort to collect data from several plants. He finds that the generating requirements range from 200 kilowatts to 20,000 kilowatts. These plants have a yearly consumption of from 50,000 kilowatt-hours to 50,000,000 kilowatt-hours. These figures do not include two or three of the new large plants, which have capacities that approximate central stations themselves and from necessity do not come within the range of this paper. It can readily be seen from the above figures that no size of generating plant can be selected as representative of the entire steel plant field.

The average plant generation was 9,610,000 kilowatt-hours for the year 1913. It goes without saying that these figures were not exceeded in 1914. The figures for 1913 also indicated an average plant load factor of 48 per cent. From these figures it can be deduced that the average steel plant power house contains 2,210 kilowatts in generative apparatus. Let us then take for our comparison a plant somewhat larger than the average, say a plant which delivers 12,000,000 kilowatt-hours per year, or 1,000,000 kilowatt-hours per month. This is more than 200,000 kilowatt-hours in excess of the average. If we assume that this plant has a load factor of 50 per cent, which has been shown to be above the average, a generator capacity of 3,000 kilowatts would be required to meet these conditions.

What size of generators should then be used in order to produce this required amount of power? If electric generators were absolutely dependable and accidents never happened, then one 3,000 kilowatt generator operating at high speed would be the most economical to install. But if there should be any delay with the generator it means a complete plant shut down. If a spare unit is then required, two 3,000 kilowatt units could be installed, which means twice the capacity and double the overhead charges. A logical installation then would be three 1,500 kilowatt units, two units to carry the load and one unit used as a spare. With this arrangement the excess installed capacity would be only 50 per cent instead of 100 per cent. Let it then be sufficient to say that in this imaginary power plant 1,500 kilowatt units are employed.

Turning then to the central station, what would be its requirements? Since the central station's duty is to supply a great many varied interests of which the steel business is only one component, the size of generators ceases to have a definite relation to the demand. They are selected to give the greatest economy. As the demand increases, one or two more generators are added to the line to meet the new load requirements. Turbo-generators have been built with as great a capacity as 30,000 kilowatts or 40,000 horsepower, while located in modern central stations today we find 15,000 and 20,000 kilowatt generating units the general rule. The comparison, then, of the central station generator with the steel plant generator can very logically be on the ten to one basis, while the relative capacities of the two plants can be taken at a much greater ratio.

Significance of Large Plants

Now that we have arrived at something definite to work from, let us investigate what it means to employ 15,000 kilowatt generators instead of 1,500 kilowatt generators. Since it is more customary to rate turbo-generators in kilo-

From a paper read at the ninth annual convention of the Association of Iron and Steel Electrical Engineers, Detroit, Sept. 8 to 11, 1915.

volt-amperes rather than kilowatts and assuming 80 per cent power factor, we can consider the above generators as being of 18,000 kilovolt-amperes and 1,800 kilovolt-amperes respectively. First, let us consider the first cost of these two capacity generators, considering the turbine and generator as a unit but omitting the condenser and auxiliary apparatus, also assuming that the 18,000 kilovolt-ampere generator has a speed of 1,800 revolutions per minute and the 1,800 kilovolt-ampere generator has a speed of 3,600 revolutions per minute. The relative prices of these two generators per kilowatt would be about two to three, that is if the first cost of the 18,000 kilovolt-ampere unit were $10 per kilowatt, then the first cost of the 1,800 kilovolt-ampere unit would be $15 per kilowatt. The boiler first cost and condenser cost would be more nearly proportional to the installed kilowatt, but even here there is always an advantage in purchasing in large capacity.

The cost of the building to house the apparatus would be greatly in favor of the larger units when the cost is reduced to the kilowatt basis. It takes but little more space for an 18,000 kilovolt-ampere unit than it does for an 1,800 kilovolt-ampere unit. Of course the building cost is not ten to one, but the ratio is, however, quite great. The building for the boilers need not be as expensive as that for the generators, in that the boilers need not require the same height or as much basement and are not equipped with a crane. The first cost is further increased in the small station by the greater ratio of the capacity of the generators installed to the power demand, caused by the spare unit. In many cases the spare unit is not employed and all generators are used to supply the peak demand. This, however, lessens the reliability of the station and is contrary to the assumption that we took as to the proper equipment of our steel plant power house.

Fixed Charges Vary Widely

The fixed charges which occur directly from the initial cost of the two plants amount from about 30 per cent of the total producing cost for the larger plant to about 50 per cent for the smaller plant. These figures are, however, only approximations, for such fixed charges will vary even for two power houses of the same relative capacity. From the above the great advantage to the central station can readily be seen, even in the purchase price or first cost of the station itself.

The management of the steel plant should welcome outside capital to take over the burden of equipping the power plant. It is not the steel plants' purpose to manufacture electricity. The management equips a power house primarily because of necessity, rather than for the return on the investment. It would much rather invest the same funds otherwise, if it were possible to do so. In many cases even a return of 20 to 30 per cent on the investment would go unheeded if satisfactory arrangements for purchased power could be made.

Can Alter Power Arrangements

Again, contracts for purchased power can be terminated on relatively short notice. The power company does not need to dismantle its station by the loss of one customer but finds other sources for the sale of power. The steel plant, however, in case power were no longer required, would have to dismantle and sell its equipment for salvage.

These facts apparently concede the advantage in first cost, and consequently fixed charges, to the central station. Even greater savings are effected by the increased economy of power production at one place. Large stations can introduce refinements that tend to economy. The installation of condensers, superheaters, economizers, water purifying and softening plants, etc., all have to do with economy of operation. Of course all of this apparatus represents an initial investment, or first cost, yet its use or disuse is not essential to the station itself and may be ordered if it is found that the saving justifies the expense. In a station of small output the expense of some or all of these items is not justified, since the interest on the investment is greater than the saving effected. In the large plant, however, these savings are very marked. The item of fuel cost alone often amounts to over 50 per cent of the total cost. In such cases it is very evident that any means taken to conserve the coal pile will be welcomed. What these actual savings of fuel by the use of condensers, superheaters and economizers are, is hard to state in the absence of certain definite conditions but they may be placed at 50 per cent for very large plants, down to nothing in small plants.

Let us consider the efficiencies inherent in the machines themselves. For the size of units that we are considering, 13 pounds of steam per kilowatt-hour is a very reasonable allowance for the 18,000 kilovolt-ampere machine and 16 pounds of steam per kilowatt-hour for the 1,800 kilovolt-ampere machine. These figures mean that the efficiency of the larger unit is 20 per cent greater than that of the smaller unit. It is indeed interesting to note how the water rate has steadily decreased in the past ten years. The general practice formerly was 20 to 40 pounds of steam per kilowatt-hour for the reciprocating engine, but we have now learned that a rate of 11 pounds of steam per kilowatt-hour has been obtained.

The labor items come next in importance. These are always out of proportion to the kilowatt supply. A large machine requires scarcely any more attendance than a smaller one. The large plant employs labor saving devices which materially help to reduce the pay roll. The salaries of foremen and superintendents proportionally decrease as the output increases.

Load factor is a very important item. The power house that supplies one kind of industry or one kind of load is quite sure to have a poor load factor. It has been shown that the average steel plant load factor is below 50 per cent. A central station supplies a varied number of industries with their peaks occurring at different times; for instance, its lighting load is heaviest in the evening; its trolley load is heaviest at seven o'clock in the morning, and six o'clock in the evening. Some industrial loads have their maximum demand at noonday, while others may have their peak loads at night. The combination of demands produces a resultant which is very favorable to the central station. The result is more efficient generation and less reserve capacity. Diversity factor means a large number of different kinds of loads combined to make one more effective load. Good diversity factor means better load factor. Many other reasons can be cited which tend to favor economy of operation in the large plant. It is economy that allows the central station to bid successfully against the isolated plant and it may be said that economy is the parent of the central station.

Greater Reserve Power

One requirement of the power house is its reliability. The large station has more reserve capacity, although the percentage of reserve to total can be much reduced. To have a generator, or even two generators, under repair does not materially affect the operation of the station. Again the refinement of the large station adds to its reliability. Duplicate bus-bars, more elaborate switching devices, the shunting of circuits, reactance in circuits, etc., all add to the reliability of service. It often happens that the service of the small plant is impaired by not providing the proper spare units and repair parts. In many plants all generators are required to operate to meet the peak load and no spare is available at all times. It is the writer's contention that the central station offers more reliable service than does the local plant.

Perhaps it might be well to see how the steel plant is to make use of pur-

chased power if it has the opportunity to buy it to advantage. It is a comparatively easy matter if the plant is to be a new one and does not already have a generating plant of its own; but if an old plant is to make the change then complications may arise of more or less serious nature. One of the stumbling blocks is the matter of frequency, which must be noted if the source is alternating current. Some hydro-electric plants generate 25 cycles. This is in line with the large majority of the existing steel plants' equipment. Sixty cycles for central stations has been coming more and more into prominence and this frequency is not in accord with the majority of steel plants. There seems to be but little difference in the choice of frequency for use at the plant. The 60-cycle apparatus is somewhat cheaper to buy but the low speeds are not as easily obtained. Low speeds are not prohibitive. however, and, if they are required for some particular operation, the extra cost of the motors can be made up by the saving in cost of the high speed motors.

Many existing plants are entirely equipped with direct current motors, making the use of a motor-generator set a requirement. The presence of alternating current lines in the plant will, however, lead to quite an extensive use of alternating current motors as a rule.

The writer does not advise the wholesale adoption of purchased power. The conditions at the plant must be analyzed. If the plant is filled with 25-cycle motors and a good power-house exists, then it would be a waste of money to discard these machines and install 60-cycle power, even though the producing cost for the same were considerable in excess of the purchase price. It often happens, however, that an extension to the plant is to be made. In such a case a start at purchased power might be attempted. Perhaps two power systems of different characteristics might be a little inconvenient but undoubtedly each system would supply a definite section and in reality no more power lines would be required than if only one system were in use.

After a beginning had been made and the local plant apparatus gradually became obsolete and in need of replacement, then a gradual change to the new system could be made until such a time as the whole plant could be changed over.

The price of purchased power largely depends upon the manner in which it is used. If the peak demand is not greatly in excess of the average power used, then the price should be very advantageous. On the other hand, if the demand is high and the consumption low, the price will be high. In some cases a certain amount of power, called block or firm power, is contracted for and any excess demand is supplied by the plant itself. This makes an ideal condition, first, because generating apparatus already installed can be used, and, second, because the peak is the expensive part to buy.

There are now about 20 to 25 steel plants using purchased power with an estimated yearly consumption of about 175,000,000 kilowatt-hours per year.

In conclusion, let us consider two things. Is there an adequate power supply available to the plant under consideration? Can that supply be adapted to the plant conditions? If these questions can be answered in the affirmative, then the power company officials should be approached and the conditions and price at which power can be purchased obtained.

No matter how inexpensively the power can be produced the selling price is the only thing that the prospective buyer need to consider. Co-operation, however, on the part of the central station and the isolated plant, must, from necessity, work to the advantage of both.

Safeguarding Electrical Installation

BY E. H. WENTZ

THE paper presented by W. Greenwood, published in the Sept. 16 issue of *The Iron Trade Review*, treats of a very broad subject and the author has treated it broadly. His statement declaring the ratio of serious and fatal accidents in the iron and steel industry as heavy when compared with other industrial pursuits, I believe is true when taken as a whole but does not apply to generation, transmission and utilization of electricity in iron and steel manufacture, notwithstanding the fact that many of such installations are more extensive than those in a large number of the commercial power plants. The reason for numerous electrical accidents may be due to the conditions in connection with aerial work, and it may be that the safety side has not been given enough serious thought.

"Every installation of electrical equipment," declares Mr. Greenwood, "is made with a presumed knowledge that every law for control of electrical energy is known . . . and possibly the laws are underestimated." If his contention is correct, it must be assumed that there is a limit to the protection possible, unless a co-operative spirit is possessed by those who have to do with the operation of such apparatus. A large percentage of electrical accidents are sustained by those who have completely ignored the first principles of ordinary judgment; and the same is true in many other branches of manufacturing. This does not lessen our responsibility, though the accident could not be justly charged to faulty installation; rather, it should be charged to carelessness on the part of the victim. However, such a charge does not achieve results; therefore the prospective victims must be educated, and when educated along the lines of safety principles, they will become co-operative and careful.

Evolution in safety has advanced in three steps: installation, co-operation and education. Installation, we consider first and foremost, but of comparatively little value without co-operation. Safety may, however, be obtained most advantageously by the process of education and to this last step may be credited very gratifying results. One may assume that the author has encountered some difficulties in persuading the electrical engineer to see things as he sees them, and the spirit of resentment is probably due to a lack of appreciation of the existent danger, the same being true of any profession. In other words, we are all converts to safety in one degree or another, and if the safety engineer had not been convertible and inclined to view the situation in the same light as those who first started the safety movement, he could not have qualified and been adept at accepting the annoyances he mentions.

Many of the statements concerning the quality of installations may at first seem radical, but we have but to turn backward not more than three or four years and note the great change in the character of work now being put in. The day is not far distant when open type switches, starters and controllers will be a matter of recollection only; nevertheless, we must have the co-operation of all fellow workmen in order to completely eliminate electrical injuries, even though the installation be the most modern from the safety standpoint.

A written discussion of an article "Taking No Chances With Electricity," by Walter Greenwood, published in last week's issue of *The Iron Trade Review*.

Effect of Hysteresis on Mild Steel

Study of Effect of Structure on Magnetic Properties of Medium Carbon Steels for Armatures and Other Parts of Electrical Machinery

BY F. C. LANGENBERG AND R. G. WEBBER

DURING THE course of some magnetic investigations which the authors have under way, six bars of 0.43 per cent carbon steel were tested, a permeameter designed after the Hopkinson yoke type being used. The results obtained were of some interest and although far from complete serve at least to show the necessity for a careful investigation of the previous history of the samples under study as well as their chemical composition.

A steel of given chemical composition may assume a great variety of structures, depending on its treatment. It is now a well-established fact that a structural change is accompanied by changes in the tensile strength, elastic limit, hardness, etc., and it seems reasonable to assume also, a change in the magnetic properties of the metal.

F. C. Langenberg is assistant in metallurgy, Harvard University, and R. G. Webber is instructor in physics and electrical engineering, Ohio State University. This paper was presented at the February meeting of the American Institute of Mining Engineers, New York.

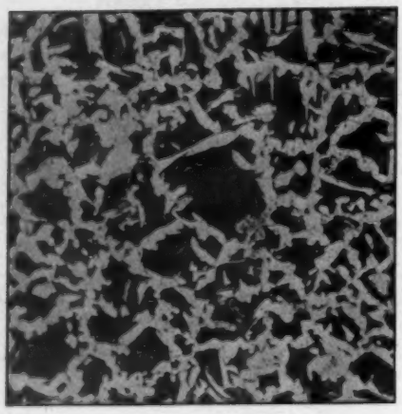
Six bars of a 0.43 per cent carbon steel were used, all the bars being taken from the same rod and treated as follows:

Bar 1.—Heated to 1,100 degrees and cooled in the furnace.
Bar. 2—Heated to 1,000 degrees and cooled in the furnace.
Bar. 3.—Heated to 900 degrees and cooled in the furnace.
Bar. 4.—Heated to 1,000 degrees and cooled in air.
Bar. 5.—Heated to 900 degrees and cooled in air.
Bar 6.—Untreated.

The bars were then turned to 13 millimeters diameter and tested by the Hopkinson yoke method. After testing, three specimens were taken from each bar, one from each end and one from the middle. The homogeneity of the bars was tested in this manner and in no instance could any difference in structure be detected between the three specimens.

Bars Nos. 1 to 3 inclusive are pearlitic in structure. The white areas are ferrite (iron with certain impurities in solution) and the dark areas pearlite, the eutectoid of Fe_3C and ferrite. Bar No. 1 has a coarser structure than No. 2, and No. 2 in turn a coarser structure than No. 3. No. 6 is also pearlitic and is similar in every way to Nos. 1, 2, 3, except that its structure is very fine. No. 6 was the untreated specimen and represents the structure of the material as it came from the rolls. Nos. 4 and 5 have an entirely different structure. On passing through the critical range on cooling the ferrite has been rejected to the boundaries of the grains and the dark portions in these samples are a mixture of pearlite and sorbite. Sorbite can be regarded as poorly defined pearlite and is one of the transition constituents between austenite, existing above the critical range, and pearlite, below the range. Bar No. 4 is more sorbitic than No. 5 and also has a larger grain.

Below each microphotograph, Figs. 2 to 7, is placed the hysteresis curve for the specimen together with some of the data which is regarded as sig-



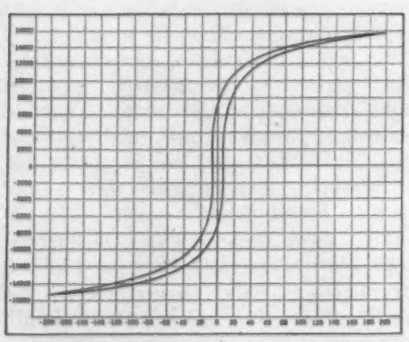
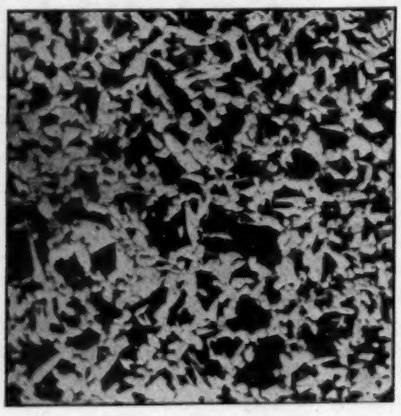


FIG. 1—BAR NO. 1, HYSTERESIS LOSS, 17,280; RESIDUAL MAGNETISM, 6,700; COERCIVE FORCE, 3.65; BRINELL HARDNESS, 131



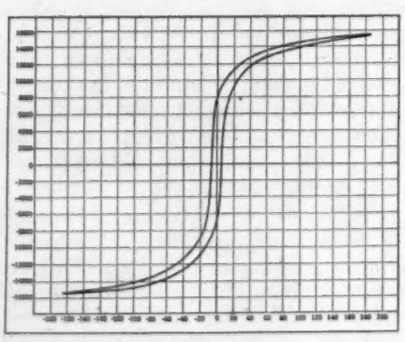
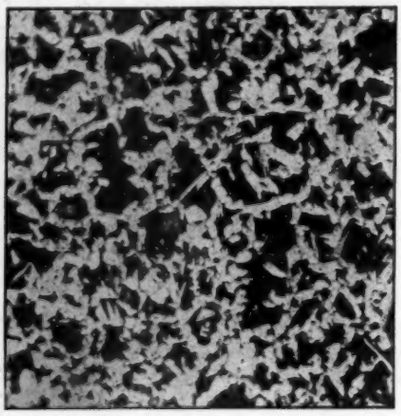


FIG. 2—BAR NO. 2, HYSTERESIS LOSS, 18,240; RESIDUAL MAGNETISM, 6,800; COERCIVE FORCE, 3.70; BRINELL HARDNESS, 131



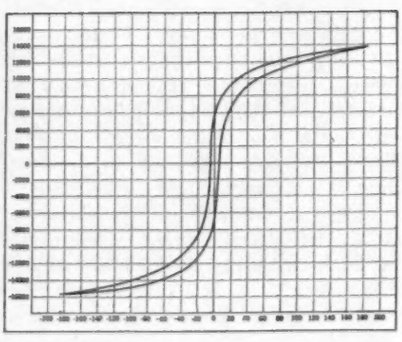
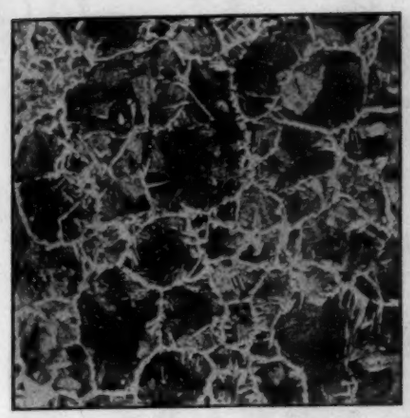


FIG. 3—BAR NO. 3, HYSTERESIS LOSS, 21,920; RESIDUAL MAGNETISM, 7,000; COERCIVE FORCE, 3.72; BRINELL HARDNESS 131



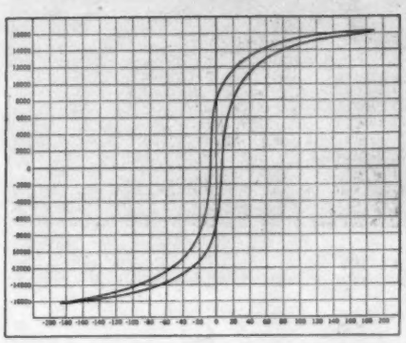
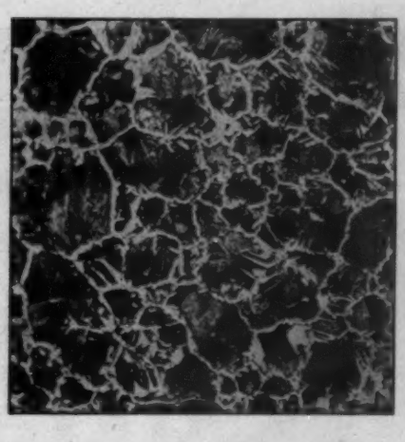


FIG. 4—BAR NO. 4, HYSTERESIS LOSS, 26,240; RESIDUAL MAGNETISM, 7,700; COERCIVE FORCE, 7.00; BRINELL HARDNESS, 140



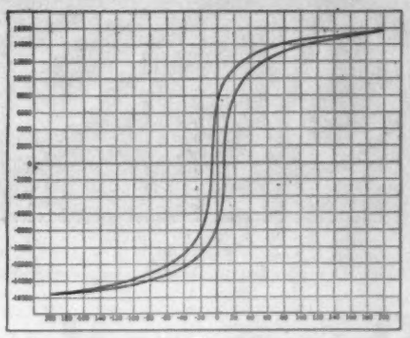
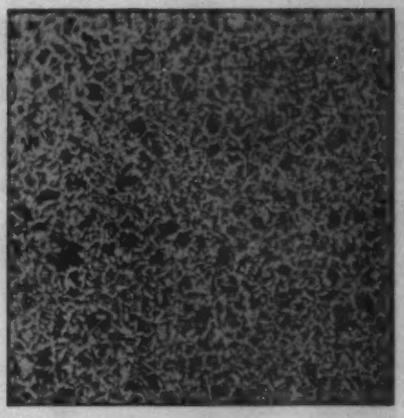


FIG. 5—BAR NO. 5, HYSTERESIS LOSS, 25,760; RESIDUAL MAGNETISM, 7,300; COERCIVE FORCE, 7.00; BRINELL HARDNESS, 131



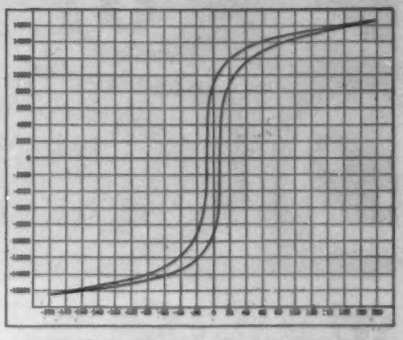


FIG. 6—BAR NO. 6, HYSTERESIS LOSS, 29,120; RESIDUAL MAGNETISM, 9,700; COERCIVE FORCE, 7.50; BRINELL HARDNESS, 131

nificant. The hysteresis loss was found as follows: The area of the loop inclosed by the *B-H* curve was measured by a planimeter. The co-ordinates being in absolute units, the resulting area as determined by the planimeter was multiplied by our scale constant, which was 40,000, and divided by 58, 58 cubic centimeters being the volume of the bar tested.

Residual curves were not determined, but for each bar the residual induction *B* was determined after the magnetizing force *H* had reached its maximum. The coercive force was determined by measuring the magnetizing force *H* necessary to reduce residual *B* to zero.

The hardness of the specimen was measured by a Brinell machine and results are expressed in Brinell hardness factors.

Bars Nos. 1, 2 and 3 present a very interesting study. The only variable factors in these three bars are the relative size of grain and the coarseness of the striations of pearlite. Bar No. 1 has a large grain and the pearlite is coarsely laminated. Its hysteresis loss per cubic centimeter was determined as 17,280.

Bar No. 2 has a finer structure than No. 1, and shows a hysteresis loss of 18,240. Bar No. 3 is still finer than bar No. 2 and shows a loss of 21,920. Bar No. 6, as before stated, is also pearlitic and differs from Nos. 1, 2 and 3 in having a much finer structure. The hysteresis loss in this bar rises to 29,120 ergs per cubic centimeter, which is 68 per cent greater than the loss in bar No. 1. It is to be borne in mind that both are in the unhardened condition.

Bars Nos. 4 and 5 show an entirely different structure from any of the other bars. Bar No. 4 has a larger grain than No. 5 but the treatment employed to give the bar its coarse structure also produced a larger proportion of sorbite than is present in bar No. 5. Bar No. 5 has a hysteresis loss 480 ergs less than bar No. 4, which seems contradictory to the results shown by the previous bars, as bar No. 5 has a finer structure than bar No. 4. The finer structure of bar No. 5, however, is only apparent and not real. The gross structure is finer—that is, the grains are finer—but the structure as revealed under higher magnification shows that bar No. 4 is composed of sorbite, laminated pearlite being almost entirely absent. In bar No. 5 considerable laminated pearlite is present.

DATA ON MAGNETIC PROPERTIES

Bar No.	Loss in ergs per cu. cent.	Residual *B*.	Coercive force.	Brinell hardness.
1	17,280	6,700	3.65	131
2	18,240	6,800	3.70	131
3	21,920	7,000	3.72	131
4	26,240	7,700	7.00	140
5	25,760	7,300	7.00	131
6	29,120	9,700	7.50	131

In magnetic testing careful attention must be given to the internal structure of the metal undergoing test. A mere statement of its condition as hardened or unhardened, annealed or tempered, is idle and often misleading. Our results lead us to infer that a minimum hysteresis loss could be obtained by the combination of large grains with coarsely laminated pearlite.

An abrasive wheel is a disk built up from an immense number of small cutting particles held together by a bond of some kind. Excessive pressure of the work against the wheel tears these cutting particles out of the bond and wastes the wheel.

Automobile cylinders are usually ground dry and the wheel connected with an exhaust system to remove the dust. If water is used, it is usually circulated in the water jackets surrounding the cylinder, and in this way, keeps the cylinder casting cool.

High Speed Friction Saw in Scully Steel & Iron Co.'s Warehouse

Warehouse Business Requires Speed

Iron and Steel Orders Which the Warehouseman Secures Are the Ones That Cannot Wait for Mill Delivery

THE quality and prices of modern standard iron and steel products, such as structural shapes, bars, plates and sheets do not exhibit any great variations. Therefore the warehouses selling steel from stock depend for their orders, not so much on the cheapness and unusual excellence of the material handled, as on the rapidity and accuracy with which orders can be filled. The emphasis laid on quick work is obvious from the fact that many orders placed for warehouse delivery are those which cannot wait for mill delivery.

The Scully Steel & Iron Co., Chicago, has made a special study of the means by which the speed of handling and filling orders for warehouse materials may be increased. At present, the company has three warehouses, one 670 feet long and 250 feet wide, and two, 300 feet long and 100 feet wide.

HEAVY PLATE SHEAR

Orders Handled Rapidly

Orders pass through the company's office with remarkable rapidity, considering the fact that the number of transactions runs into thousands every month. At 7:00 o'clock a. m. the first mail is being opened, time-stamped and sorted. The orders are sent to the operating department, where they are checked with the stock books, written up in triplicate, checked back and sent to the different departments of the warehouse through pneumatic tubes. From the time the envelope containing an order is opened until the arrival of the instructions in the warehouse, 35 minutes is allowed, and every order that does not require special work is shipped the day it is received. To accomplish this, accuracy is just as important as speed. The constant aim has been to make the entire organization realize that speed without accuracy is of no value.

To fill orders promptly, the Scully company has installed in its warehouse modern equipment including

ARRANGEMENT OF MATERIALS IN SCULLY STEEL & IRON CO.'S WAREHOUSE

friction saws, capable of cutting 24-inch 100-pound beams at a rate of one cut every 16 seconds; high speed electric cranes which move material the length of the warehouse to a car in 11 seconds, plate shears designed to cut 1-inch plate and slow saws for work that has to be cut to exact length, also are provided. In addition, shears for sheets of lighter gages and corrugating rolls with a capacity up to 12 gage, together with cutting machinery for tools and small bars have been installed.

Illustrates Need for Rapid Work

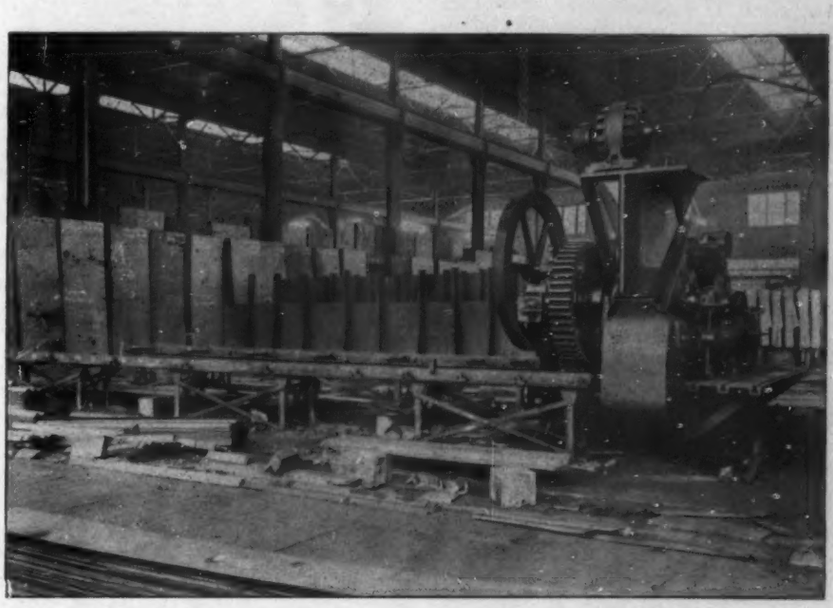
As an illustration of the emergencies which confront the iron and steel warehouseman, George Mason Jr., vice president of the Scully company, tells of a certain accident to a building under construction, which caused a serious cave-in. A Chicago firm was instructed during the night to start repairs immediately. At 8:00 o'clock the next morning its order was placed with the Scully company for 60 tons of material, of which every piece had to be cut to length. This material was delivered by noon the same day, which, under the circumstances, was considered something of a feat.

The Art Metal Construction Co., Jamestown, N. Y., held its annual sales convention at the main office in Jamestown, July 21 to July 24. The convention was held under the general direction of E. St. Elmo Lewis, vice president and general manager of the company, assisted by B. C. Couchman, general sales manager and other members of the sales department. A large number of salesmen were present at the session.

Will Discuss Engineering

A portion of the proceedings of the second Pan-American Scientific Congress, which will be held in Washington Dec. 27, 1915, to Jan. 8, 1916, will be devoted to engineering subjects. The congress will be held under the auspices of the government of the United States. William Phillips, third assistant secretary of state, will be chairman. The American Society of Mechanical Engineers has appointed the following official representatives: Calvin W. Rice, secretary, 29 West Thirty-ninth street, New York; W. H. Bixby, 1709 Lanier place, Washington, D. C.; Charles T. Plunkett, 6 Park street, Adams, Mass.; Carl C. Thomas, professor Johns Hopkins University, Baltimore, Md.

Grinding machines are run at high speed and the question of lubrication should be carefully considered. Don't overlook the directions of the makers.



SHEAR FOR CUTTING ANGLES

Will Show Latest Foundry Devices

Annual Exhibition at Foundrymen's Convention, Atlantic City, Sept. 25 to Oct. 1, Will Include Moving Pictures and Furnace in Operation

A FEATURE of special interest at the joint annual convention of the American Foundrymen's Association and the American Institute of Metals, which takes place at Atlantic City, N. J., Sept 28 to Oct. 1, 1915, will be the tenth annual foundry and machine exhibition under the auspices of The Exhibition Co. This will open on Sept. 25 and close on the final day of the convention, and will be held on Young's Million Dollar pier, a structure of steel and concrete which extends for 1,700 feet into the ocean. Covering practically all of the available space on the immense pier, the displays of modern foundry and machine tools will include many striking exhibits, such as an electric furnace in actual operation, the castings made from its product being cleaned and machined by other exhibitors. Electric current, both direct and alternating, is to be available in various voltages, as well as steam and compressed air. On account of the wide range of power placed at their disposal, many exhibitors have decided to show their machinery in actual operation. The wide interest of modern industries in safety first propaganda and methods will be reflected in several displays of devices calculated to prevent injuries in the foundry and machine shop. Moving pictures depicting iron manufacture will be shown. Companies planning to install exhibits are as follows:

AJAX METAL CO., Philadelphia.—An extensive line of ingot metals will be displayed and a variety of castings made from these metals will be shown; represented by G. H. Clamer, W. J. Coane, Samuel K. McClure, H. L. Carpenter Jr., A. MacDougall, F. M. Willeson and C. F. Hopkins.

ARCADE MFG. CO., Freeport, Ill.—The extensive line of molding machines manufactured by this company will be shown in operation; this includes jolt-ramming machines, the modern molding machine, both hand and air operated; combination jolt and squeezing machines, hand squeezers, jolt-ramming, roll-over pattern-drawing machines; air squeezers, core jolters and other equipment will be displayed, including sand sifters and the Brillion pouring device.

ATKINS, E. C., & CO., Indianapolis.—An improved type of metal cutting hack saw will be displayed in operation, as well as a full line of saws for all purposes, including circular, band and friction disc. A non-breakable hack saw blade also will be exhibited; represented by Elmer A. Heidlinger.

AYER & LORD TIE CO., Chicago.—Creosoted wood blocks for foundry, machine shop and general industrial plant service will be displayed, showing various installations throughout the United States; represented by A. H. Noyes, W. H. Blythe, B. S. McConnell and E. L. Parvin.

BERKSHIRE MFG. CO., Cleveland.—An operating exhibit of molding machines will be made, which will include an automatic machine equipped with sand riddle and conveyor, air squeezer, core machine, universal molding machine, vibrators, etc.; represented by W. D. Fraser, F. Hulec and G. L. Cannon.

BESLY, CHARLES H., & CO., Chicago.—Surface grinders and grinding machinery.

BIRKENSTEIN, S., & SONS, Chicago.—Brass and bronze ingots, with a varied line of castings made from different alloys will be shown; represented by Lee Kahn, E. J. Schwab, J. W. Long and Harry Birkenstein.

BLYSTONE MFG. CO., Cambridge Springs, Pa.—A new, low charging, core sand and facing mixer equipped with a rotary screen will be shown. It is approximately 11¼ inches lower than the type of mixer built by this company in the past and the objectionable feature of height has been overcome by this type of construction; represented by Luther G. Conroe and H. J. LeFevre.

BROWN SPECIALTY MACHINERY CO., Chicago.—A working display will be made of a core machine with a maximum capacity for making round cores 3 inches in diameter, a core machine with a maximum capacity for making round cores 5 inches in diameter and another machine with a capacity for making round cores up to 7 inches in diameter. In addition, an electric and a pneumatic shaker and two sizes of a revolving barrel sand blast machine will be displayed; represented by H. P. Furlong, John Laycock, R. L. Laycock and E. A. Rich Jr.

BUCKEYE PRODUCTS CO., Cincinnati, O.—The foundry specialties and equipment manufactured by this company will be displayed; represented by C. J. Goehringer, B. Bernbaum, R. B. Ferguson, C. S. Weigert and J. B. Carpenter.

BUCH FOUNDRY EQUIPMENT CO., Bridgeport, Montgomery Co., Pa.—An operating exhibit of molding equipment will be made, consisting of a hand jar-ram, squeezer, roll-over and pattern-drawing machine, as well as an electrically-operated jar-ramming, squeezer, roll-over and pattern-drawing machine; represented by R. S. Buch, J. E. Buch, G. E. Bates and J. L. Nute.

CARBORUNDUM CO., Niagara Falls, N. Y.—A complete line of carborundum and aloxite wheels for grinding cast iron, brass, bronze, aluminum, steel and malleable castings will be displayed. Metallic silicon, carborundum fire sand and carborundum paper and cloth also will be exhibited; represented by George R. Rayner.

CATARACT REFINING & MFG. CO., Buffalo.—Samples of foundry core oil and parting, cores made by the use of these core oils as a binder and also specimens of machine work made with cutting compounds and cutting oils furnished by this company will be displayed; represented by H. C. Hutchins, R. J. Collins, F. E. Hill, J. Purvis, A. A. Schaefer, J. E. Chism, F. M. Edwards and L. S. Smith.

CLARK, CHARLES J., Chicago.—A blast meter which is a gage for measuring the volume of blast supplied to cupola and malleable furnaces, will be shown. A working demonstration of the meter will be made and meters of various capacities will be displayed; represented by Charles J. Clark.

CLARK FOUNDRY CO., Rumford, Me.—A combined punch and shear will be shown; represented by F. B. Clark and S. J. Gonya.

CLARK, GEORGE P., & CO., Windsor Locks, Conn.

CLEARFIELD MACHINE SHOPS, Clearfield, Pa.—A model of a 50,000-pound, 8-foot wet pan used for mixing and tempering foundry sand, core sand, etc., will be displayed. In addition to showing the features of its construction, the model will run on actual material to illustrate the method of operation; represented by F. B. Reed and P. B. Reed.

CLEVELAND AUTOMATIC MACHINE CO., Cleveland.—A motor-driven, 2½-inch full automatic machine will be shown in operation. A great variety of speeds in both directions is obtainable from the motor-drive and the speed increases and decreases when the tools are cut on the various diameters as the operations take place; represented by J. P. Brophy.

CLEVELAND PNEUMATIC TOOL CO., Cleveland.—This exhibit will consist of a complete line of air tools, including riveting and chipping hammers, all sizes of air drills, valve, emery, bench and center grinders, corner and compound drills, five sizes of rammers, air hose couplings, etc.; represented by H. S. Covey, A. Scott, J. A. Day, G. Gregory and F. E. Schwarze.

CLIPPER BELT LACER CO., Grand Rapids, Mich.—Belt lacers and belt hooks will be shown. The belt lacer is a small, portable tool in which are inserted a row of belt hoops. The squared end of the belt to be laced then is inserted and by depressing the handles, the hooks are deeply imbedded into the end of the belt, leaving a uniform row of hooks extending across the belt end. When the other end is silimarly treated, the two ends are brought together around the face of the lower pulley in such a way as to intermesh the loops. A rawhide pin is slipped through these intermeshed loops and the job is finished; represented by William F. Kall and J. R. Yost.

DIXON, JOSEPH, CRUCIBLE CO., Jersey City, N. J.—All kinds of graphite products, including crucibles, stirrers, etc., for brass foundry use will be displayed; represented by Frank Krug.

FELT & TARRANT MFG. CO., Chicago.—Demonstration will be made of an adding and calculating machine.

FOUNDRY, THE, Cleveland. — A large booth will be fitted up as an office and rest room for the use of visiting foundrymen; represented by John A. Penton, A. O. Backert, J. D. Pease, H. Cole Estep, E. C. Kreutzberg, A. W. Howland, G. O. Hays, L. C. Pelott and S. H. Jasper.

GARDNER MACHINE CO., Beloit, Wis.—A complete line of grinding machines and accessories will be displayed.

GENERAL ELECTRIC CO., Schenectady, N. Y.—Arc welding equipment will be shown in operation, as well as a centrifugal com-

pressor for furnishing blast for cupola operations.

GOLDSCHMIDT THERMIT CO., New York.—A complete line of heating thermit cans for reviving dull iron in the ladle, making semi-steel, keeping risers liquid, etc., and titanium thermit cans for purifying molten iron and steel and increasing fluidity will be displayed. A comprehensive exhibit also will be made of the extensive line of alloys made by this company for foundry use. This includes ferro-vanadium, ferro-titanium, cupro-vanadium, manganese, chromium, cobalt, manganese-copper, manganese-titanium, phosphor-copper and manganese-aluminum. Specimen thermit welds on heavy sections will be shown, one of the most important of which will be a weld on a 9¼-inch crankshaft. A display also will be made of welding pipe joints by the thermit process; represented by H. G. Silsbury, D. B. Browne, William Aldrich, H. D. Kelley and J. G. McCarty.

GRACETON COKE CO., Graceton, Indiana Co., Pa.—Foundry coke manufactured by this company will be exhibited; represented by C. M. Lingle, W. F. Gates, T. M. Doherty and M. F. Brandon.

GREAT WESTERN MFG. CO., Leavenworth, Kas.—Several gyratory foundry riddles of new type, together with portable supports for these machines, will be shown in operation; represented by G. W. Combs and F. A. Pickett.

HARDY, F. A., & CO., New York.—A complete line of safety glasses and eye protectors for use in foundries and machine shops will be shown. Also, goggles for welders and melters equipped with special lenses will be exhibited; represented by W. B. Gosman.

HAYWARD CO., New York.—An electric motor clam shell bucket suspended from a hoist, as well as a midget derrick outfit will be exhibited. Numerous other buckets for foundry use and other industrial purposes also will be displayed; represented by H. M. Davison, H. S. Atkinson and C. F. Hutchings.

HERMAN PNEUMATIC MACHINE CO., Zelienople, Pa.—The line of molding machines manufactured by this company will be operated and the exhibit will include an independent turn-over and pattern-drawing device. This machine jars the mold, draws the pattern and finishes the mold complete to receive the cores. It is employed successfully on tunnel segments, bolsters, boiler sections, etc. A combination jar-ramming, squeezer and stripping plate machine will be exhibited as a plain squeezing machine and as a combination jar-ramming, squeezing and stripping plate machine. In the demonstration of this machine snap flask work will be mounted with the use of split patterns, also match plate and stripping plate work. Both copes and drags will be made in one operation on a portable jar-ramming, stripping plate machine. In addition, small plain jar-ramming machines and core-making machines, demonstrating the application of the jar-ramming principle to the production of cores, will be exhibited; represented by A. M. Frauenheim, Alfred Herman, Thomas Kaveny, M. L. Heyl, R. F. Ringle, A. Rodgers, Alfred McWithey and Joseph Larson.

HEROLD BROS. CO., Cleveland.—Various types of brushes employed in foundry and machine shop operation, including the "Electra Weld" wire wheel brush manufactured by this company, will be displayed. A line of molders' brushes also will be shown.

HILL & GRIFFITH CO., Cincinnati, O.—No display of the extensive line of foundry supplies manufactured by this company will be made, but a booth will be fitted up attractively where the representatives of the Hill & Griffith Co. can meet their friends; represented by William Oberhelman, J. M. Glass, James A. Carey and F. McCarthy.

INGERSOLL-RAND CO., New York City.—A complete line of pneumatic tools will be displayed, including drills in a wide range of sizes and types for drilling, reaming, tapping, flue rolling and other similar work and chipping, scaling and caulking hammers for general foundry service. Riveters will be displayed equipped both with and without safety rivet set retainers, in both outside and inside trigger patterns. A feature will be made of a grinder, as well as a close quarter drill. Both bench and floor type sand rammers will be shown, as well as air motor hoists in capacities from one-half to five tons. In addition, the Ingersoll-Rand Co. is furnishing two compressors for supplying air for the various exhibits. One of these machines is an Imperial, short belt, electric motor-driven unit of the duplex type and the other is an Ingersoll-Rogler straight line steam-driven machine. Both compressors are wholly enclosed, dirt and dust-proof, and are automatically lubricated; represented by George A. Gallinger, F. K. Armstrong, George S. Johnston, L. W. Schnitzer and Walter A. Johnston.

INTERNATIONAL MOLDING MACHINE CO., Chicago.—An extensive line of molding equipment will be exhibited, including turn-over draw, jar-ramming, core-making and combination molding machines of several different styles, as well as power and hand squeezers; represented by Edward A. Pridmore, W. W. Miller, J. W. Dopp and F. W. Hamel.

INTERNATIONAL STEAM PUMP CO., New York.—Sand riddlers, core wire straighteners and an air compressor will be shown in operation. The sand riddlers are either air, steam or electrically-driven and are built in any type to meet the particular conditions to be met. The steam or air type of the large machine is provided with an improved cushioning device fitted to the cylinder, which insures the minimum vibration of the supporting frame and at the same time imparts the right motion to the reciprocating screen with a minimum power consumption. In the motor-driven machine the reciprocating rod is driven through reduction gears from the motor. The core wire straightener is designed to reclaim the bent wire used in strengthening foundry cores. It can be arranged for either belt or electric drive. The compressed air for other exhibitors will be furnished by a Laidlaw motor-driven feather valve air compressor furnished by the International company. The frames are completely enclosed, thereby protecting the working parts from the foundry dust and grit. The lubrication is automatic, the connecting rod and crosshead bearings running in oil.

IRON TRADE REVIEW, THE, Cleveland.—A large booth will be fitted up as an office and rest room for the use of visiting foundrymen; represented by John A. Penton, A. O. Backert, J. D. Pease, H. Cole Estep, E. C. Kreutzberg, A. W. Howland, G. G. Hays, L. C. Pelott and S. H. Jasper.

JENNISON-WRIGHT CO., Toledo.—Sections of creosoted wood block floors for machine shops, foundries, loading platforms, wharves, piers, etc., will be shown. Photographs also will be displayed of various installations; represented by H. G. Jennison, L. P. Drinker, F. E. Jennison, Isaac Wright and Frank B. Goodman.

KING, JULIUS, OPTICAL CO., New York City.—A full line of goggles for use by foundry employes in chipping, cleaning and other hazardous operations will be shown. In addition, arc welders helmets, babbitting masks, welders goggles, etc., will be displayed. A special machine for testing lenses for goggles will be operated, as well as a device which will demonstrate the proper color of lenses for goggles to be used by welders, melters, etc.; represented by Walter G. King and F. W. King.

LANDIS TOOL CO., Waynesboro, Pa.—A 12 x 36-inch grinding machine will be shown in operation; represented by T. H. King.

LEHIGH COKE CO., South Bethlehem, Pa.—Photographs of various departments of the company's plant will be displayed, showing in detail the manufacture of by-product coke, as well as a graphic representation of the by-products obtained in the manufacture of this fuel, such as sulphate of ammonia, tar, gas, benzol, toluol, xylol, solvent naphtha, etc.; represented by D. A. Barkley.

LINCOLN ELECTRIC CO., Cleveland.—Several arc welding outfits will be shown in operation repairing castings and cutting-off risers and heads; represented by Robert E. Kinkead.

LUPTON'S, DAVID, SONS CO., Philadelphia.—A complete line of products for lighting and ventilating, with particular reference to lighting and ventilating foundry buildings, will be displayed. Various types of steel sash, skylights, operating device, etc., will be exhibited, as well as photographs of a large number of foundries and other buildings in which Lupton products have been used. The Pond truss roof formation, designed especially for use in foundries and forge shops, also will be shown; represented by Clarke P. Pond and C. F. P. Buckwalter.

MACLEOD CO., Cincinnati.—In this exhibit will be displayed a sand blast machine, blacking swab sprayer, portable oil burners and an oxy-acetylene welding and cutting torch; represented by W. F. Stodder.

MALLEABLE IRON FITTINGS CO., Branford, Conn.—A complete line of hardened steel vibrators, ranging in size from ⅜ to 2 inches piston diameter, will be displayed. All parts of these vibrators are hardened and ground, the cylinders lapped and great accuracy is maintained throughout. Practical demonstrations of the operation of these vibrators will be made; represented by G. B. Pickop.

McCORMICK, J. S., CO., Pittsburgh.—An extensive line of foundry supplies will be exhibited, including Lik-Kor binder, and a Blystone sand mixer also will be shown; represented by J. S. McCormick, T. E. Malone and E. R. Costley.

MIDLAND MACHINE CO., Detroit.—A light 6-inch jolt-ramming roll-over molding machine will be shown in operation which has a lifting capacity of 1,000 pounds and will handle flasks up to 32 x 42 inches with a 12-inch pattern draw. Other equipment to be exhibited will consist of a hand roll-over machine, small coremaking machine and a pneumatic riddle with a special device; represented by George L. Grimes and C. J. Skeffington.

MONARCH ENGINEERING & MFG. CO., Baltimore. — The extensive line of crucible metal melting and refining furnaces, as well as the heating furnaces manufactured by this company will be exhibited; represented by H. D. Harvey.

MOTT SAND BLAST MFG. CO., New York.—A new type of sand blast barrel will be shown in operation, as well as a hose-type machine and a cabinet for matting or imparting a velvety finish to softer metals and a rotary compressor for pressures up to 15 pounds. A general line of sand blast apparatus and accessories also will be displayed; represented by David Mayer, E. J. Rosenthal, F. F. Hull, George Fletcher and Edward Keis.

MUMFORD, E. H., CO., Elizabeth, N. J.—The various types of molding machines to be displayed by this company will be shown in

operation; these include plain jolt-ramming machines, pit pattern-drawing mechanism, split pattern machines, plain power squeezers, combination jolt, squeeze, ramming, split pattern machines and combination jolt squeezer machines.

MUMFORD MOLDING MACHINE CO., Chicago.—A new type of molding machine will be shown in operation and a working model will be displayed demonstrating the working parts of the jar-ramming machine built by this company; represented by J. T. Lee, A. F. Jensen and D. M. Whyte.

NATIONAL ENGINEERING CO., Chicago.—A core sand and facing mixer will be shown in operation. It is claimed that it will mix core sand with less binder than ordinarily required as a result of the thorough mixing of the binder with the sand. For the same reason it is claimed that it will mix facing sand with less coal dust than ordinarily is required. This mixer also can be utilized for reclaiming gangway waste, or sand from old cores shaken-out of castings. This is accomplished by adding a small amount of new molding sand to the old sand and by thoroughly incorporating the new sand grains with the old, a homogeneous mixture is obtained. It is claimed that by the use of this machine one man can mix all of the facing and core sand required in a jobbing foundry employing 40 to 50 molders; represented by P. L. Simpson.

NEW HAVEN SAND BLAST CO., New Haven, Conn.—A sand blast rolling barrel will be exhibited, as well as an automatic hose-type machine controlled entirely by opening and closing an air valve and a sand blast barrel designed particularly for cleaning large work; represented by C. E. Billings and C. S. Johnson.

NORMA CO. OF AMERICA, New York.—A complete line of precision ball, roller, thrust and combination bearings will be displayed. Not only will the product be shown, but ample opportunity will be afforded for the consideration of the mounting of the bearings and the assembling of parts into machines as a whole; represented by John T. R. Bell, E. A. Perkins, G. R. Bott and O. P. Wilson.

NORTON CO., Worcester, Mass.—Various types of bench and floor grinding machines equipped with hoods will be displayed and some of this equipment will be operated. The machines that will be exhibited will consist of two 1¼-inch bench machines equipped with hoods of different types and a 1¼-inch floor stand equipped with a hood of the closed type. In addition, grinding wheels, particularly those of the coarse type used in foundry work, will be shown; represented by R. G. Williams, Carl F. Dietz, S. A. Craig, Oscar E. Nordstrom and George S. Welker.

OBERMAYER, S., CO., Chicago.—A booth will be fitted up for the reception of the friends and customers of this company; represented by S. T. Johnston, E. D. Frohman, C. M. Goldman, F. H. Dodge, W. H. Fitzpatrick and J. J. McDevitt.

OSBORN MFG. CO., Cleveland.—The extensive line of molding machines manufactured by this company will be shown in operation. A distinctive feature of this exhibit will be a 42-inch jar-ramming molding machine which will be electrically-driven and a new type of roll-over machine. In addition, a display will be made of several types of squeezers, including the split pattern, jolt and plain squeezer with sand straddle base, jolt-ramming machine for making cores, small roll-over machine, roll-over hand jolt, roll-over rock-down and roll-over drop draft machines; represented by H. R. Atwater, E. W. Jacobi, E. T. Doddridge, M. W. Zeeman, J. H. Galloway, E. S. Carman, Paul Ryan, F. G. Smith and F. D. Atwood.

OXWELD ACETYLENE CO., Chicago.—Oxweld cutting and welding equipment, blowpipes, regulators and accessories will be shown and a working demonstration will be made of welding iron and steel castings and other metals and cutting steel risers and billets; represented by W. S. Hoyt, R. R. Browning, C. K. Bryce, L. E. Ogden and P. A. Mauerhoff.

PANGBORN CORPORATION, Hagerstown, Md.—Various types of sand blast machines and allied equipment will be shown in operation. Castings of all kinds will be sand-blasted throughout the week, which will include castings made from metal melted in the Snyder electric furnace.

PAXSON, J. W., CO., Philadelphia.—This exhibit will specialize on sand blast cleaning equipment and a horizontal sand blast tumbling barrel with oscillating nozzles will be shown. In addition, a line of molding sands and foundry facings will be displayed and an exhibit will be made of blue prints and photographs of sand blast plants, sand blast machines, sand separators, suction and bucket elevators, sand and dust collectors, elevating equipment, sand blast cabinet and an oblique sand blast tumbling barrel combined with cabinet. A further display of photographs will be made containing approximately 500 views of foundry equipment, supplies, sand banks, clay pits, Paxson boats and the company's foundry, machine and forge shop; represented by Howard M. Bougher, Edward M. Taggart, Joseph S. Hibbs, James B. Ellis, I. F. Kremer and Francis J. Zippler.

PICKANDS, BROWN & CO., Chicago.—An artistic display of Solvay coke will be made in the form of a liberty bell. It will be a replica of the original, about 12 feet high. The display will bear the following slogan: "Liberty Bell and Solvay Coke—Messengers of Freedom"; represented by J. A. Galligan.

PRIDMORE, HENRY E., Chicago.—The extensive line of molding machines manufactured by this company will be shown in operation, including stripping plate, hand rock-over drop, power rock-over drop, squeezer, plain electric and combination jarring machines. Several of these machines recently have been greatly improved and these new features will be demonstrated; represented by Mrs. E. M. Pridmore, Harry Pridmore, D. F. Eagan, C. H. Ellis and A. V. Magnuson.

READY TOOL CO., Bridgeport, Conn.—Lathe tools, machine dogs and boring bars will be displayed, as well as a "Safety First" belt stick and laminated Stellite tools in several designs, Heavy roughing tools for both rifle barrel and shrapnel work also will be displayed; represented by Thomas and Harold Fish.

RICHEY, BROWNE & DONALD, Maspeth, New York.—A roller-ramming molding machine with sand-handling appliance will be shown in operation. The roller-rammer eliminates hand-ramming entirely and prevents the necessity for tucking and venting. The roller is operated on a broken-link rack bar, which enters a pit at the base of the machine. Its adjustable sides are constructed to permit the use of patterns of varying widths while maintaining a stripping edge and securing absolute rigidity of the pattern. The drawing plate and pattern are supported by two air springs, thereby balancing the weight and making the operation easy, while the mechanism is so adjusted that the patterns can be drawn in perfect alignment. A standard vibrator is employed and the working parts of the machine are enclosed. The sand-handling appliance consists of a large sand shovel which handles in one operation all the sand required to make one mold, thereby eliminating hand shoveling. In addition, it is equipped with a sand breaker and mixer, which removes the sand from the flasks after the castings have been made; represented by Walter H. Hofmann and E. Foster Babbitt.

ROBESON PROCESS CO., New York.—The exhibit space of this company will be fitted up as a rest room for visiting foundrymen. Samples of glutrin will be displayed; represented by G. N. Moore, T. J. Tyan and R. S. Hughes.

ROGERS, BROWN & CO., Cincinnati.—Moving pictures entitled "From Mine to Molder", depicting the various processes of iron manufacture from the mining of the ore to the pouring of the castings, will form the principle feature of this company's exhibit. A daily display of these pictures will be made at 2:30 p. m.; represented by A. A. Fowle., F. W. Bauer, T. A. Wilson, A. O. Sonne, Cecil Bertie, George R. Sullivan, F. J. Waldo, H. W. Fernald, Otto Arlt, R. W. Clark, J. C. Claussen and Standish Meacham.

SAND MIXING MACHINE CO., New York.—A machine for cutting and preparing molding sand will be operated. It is driven electrically and is built in several sizes from 4 feet 8 inches to 7 feet. It has a capacity for cutting about 10 heaps per hour and is operated preferably at night, only one man being required. The machine also can be employed successfully for mixing core and facing sand; represented by V. E. Minnich.

SLY, W. W., MFG. CO., Cleveland.—A sand blast barrel will be shown in operation and a display will be made of photographs depicting the extensive line of cleaning room equipment manufactured by this company; represented by George J. Fanner, P. W. Graue and Alfred Anderson.

SMITH, R. P., & SONS CO., Chicago.—Safety congress shoes for molders will be exhibited; represented by J. B. Smith Jr.

SNYDER ELECTRIC FURNACE CO., Chicago.—One of the features of the exhibition will be the operation of a Snyder electric furnace, which will melt cold scrap and will pour heats three times daily, namely at 11 a. m., 2 and 5 p. m. The finished castings will be cleaned by sand blast machines operated in adjoining booths and a part of each day's output will be machined by some of the machine tools that will be displayed. Tests will be made at Philadelphia of the castings from each heat and the results will be announced the following day. Each heat will be taken off under the direction of a foundryman, which will greatly add to the practical and commercial aspect of the undertaking. The furnace, which will be operated on a basic bottom, will be of the one-ton type with a capacity of 10 tons of steel in 24 hours; represented by Carl H. Booth, F. J. Ryan and W. D. Walker.

STANDARD SAND & MACHINE CO., Cleveland.—A batch mixer will be shown in operation and a large batch mixer and a core pulverizing machine also will be displayed; represented by Harry E. and H. G. Boughton.

STERLING WHEELBARROW CO., West Allis, Wis.—Seven new styles of rolled steel foundry flasks will be exhibited for the first time, which are made of special rolled flask material, but will be differently equipped than flasks exhibited heretofore. These new styles have been in use for some time and have found favor with foundrymen generally. In addition, wheelbarrows, wedges, skim gates, snap flasks, etc., will be displayed; represented by I. R. Smith, E. W. Sample, E. W. Dowd, George L. Lambkin and H. A. White.

STODDER, W. F., Syracuse, N. Y.—A suction sand blast nozzle will be displayed, as well as photographs of the Broughton core

sand mixer; represented by W. F. Stodder, W. J. Van Zandt and M. A. Stodder.

STRONG-KENNARD & NUTT CO., Cleveland.—A complete line of protection glasses for chippers, grinders, welders and other industrial operatives will be displayed. A feature will be made of a testing device to test the strength and efficiency of the goggles that will be shown. Another device will be operated which will show the value of colored glasses for welders; represented by B. W. Nutt.

STUART AMERICAN PRODUCTS CO., Memphis, Tenn.—A burner will be exhibited for burning fuel oil.

SULLIVAN MACHINERY CO., Claremont, N. H.—Compressed air for operating various tools and machines exhibited at the show, will be supplied by a Sullivan angle compound air compressor, having a displacement capacity of 445 cubic feet per minute against 100 pounds terminal air pressure. This machine will be driven by a belt with a belt tightener connection, from a 75-horsepower Westinghouse electric motor. Photographs of other types of Sullivan air compressors and of work done by compressed air equipment in the foundry will also be shown. Frank A. Track will be in charge of the exhibit.

TABOR MFG. CO., Philadelphia.—All of the molding machine equipment to be displayed will be shown in operation. Various types of machines that will be exhibited include shockless jarring, combination shockless jarring, roll-over and pattern-drawing, both stationary and portable types; stationary and portable plain power squeezers, jarring squeezers, plain jarring, shockless jarring, hand-ramming roll-over and combination shockless jarring and squeezing. In addition, an exhibit will be made of the Taylor-Newbold inserted tooth cold saw applied to a Newton cold saw cutting-off machine, which will be operated cutting off bar stock; represented by Wilfred Lewis, H. K. Hathaway, H. W. Brown, J. T. Ramsden, J. H. Coleman, H. W. Impey, D. J. Martin and Jacob Degler.

THOMAS IRON CO., Easton, Pa.—Full-size pigs of sand cast "Thomas-Vanadium" pig iron will be shown, as well as specimen castings made from mixtures of which this iron forms the greater part. Full-page advertisements published during the past year in *The Iron Trade Review* and in THE FOUNDRY, suitably framed, also will be on display; represented by Philip E. Wright, Willard Wright and E. Arthur Tutein.

TITANIUM ALLOY MFG. CO., Niagara Falls, N. Y.—Samples of titanium-treated iron and steel, brass and bronze castings will be shown, as well as a special line of titanium aluminum bronze castings; represented by N. Petinot, R. T. Harris, A. C. Hawley, W. M. Corse, H. R. Corse and C. Vickers.

UNION STEAM PUMP CO., Battle Creek, Mich.—This operating exhibit will consist of several enclosed type, belt and steam-driven horizontal compressors and several sizes of vertical duplex and single cylinder compressors. This equipment will be so arranged that the movement of a good many of the inside parts can be observed when the machines are running. Several steam and power pumps also will be operated; represented by C. A. Stuck and K. D. Smith.

UNITED STATES GRAPHITE CO., Saginaw, Mich.—Graphite products for foundry use.

WATERBURY WELDING CO., Waterbury, Conn.—Foundry riddles.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa.—A 500-ampere, 60-horsepower arc-welding set will be shown in operation. The operator will perform welding operations on various castings and a number of examples of difficult jobs welded by this equipment will be displayed; represented by R. F. Moon, H. C. Stier, W. H. Patterson, J. H. Bryan and H. W. Beaumont.

WHITE & BRO., Philadelphia.—Samples of various grades of ingot metals will be shown, as well as a variety of castings made from these metal mixtures; represented by John T. Fegley, Raymond Hunter, George W. Proctor, Howard M. Rennie, G. Wilbur Nixon and J. D. K. McLees.

WHITING FOUNDRY EQUIPMENT CO., Harvey, Ill.—A pictorial display will be made of the extensive line of foundry equipment manufactured by this company, together with numerous views of foundry installations; represented by C. A. Hardy and R. H. Bourne.

WILLSON, T. A., & CO., Inc., Reading, Pa.—A display will be made of safety glasses and eye protectors for all industrial requirements. A goggle especially designed for grinders, machinists and operatives engaged in light work will be shown; represented by H. W. Davie and Gordon D. Richardson.

WOOD, T. B., SONS CO., Chambersburg, Pa.—The Wood system of tapering snap flask molding, comprising taper snap flask and automatic adjustable snap jackets, will be demonstrated. The use of this flask will be shown in connection with molding machines, as well as bench and floor work. The adaptability of the snap jacket to both straight and tapered side molds will be demonstrated and specimens of castings made with this equipment will be exhibited; represented by Charles O. Wood, George M. Naylor and Victor Lesher.

WOODISON, E. J., CO., Detroit.—This exhibit will consist of automobile cylinders, in the making of which a liquid core binder was used for making the cores; represented by E. J. Woodison, George A. Burman and P. G. Smith.

WYOMING SHOVEL WORKS, Wyoming, Pa.—This exhibit will consist of all styles and patterns of shovels, particularly those adapted for foundry use.

Some Features of Central Station Power

BY E. CHESROWN

AN INTERESTING paper entitled "Buying Power for the Rolling Mill," was presented at the recent Detroit meeting of the Association of Iron and Steel Electrical Engineers by Brent Wiley and Wilfred Sykes, of the Westinghouse Electric & Mfg. Co. This paper, which was published in the Sept. 16, issue of *The Iron Trade Review*, contained considerable information and statistical data of great interest. Among other things, it showed strikingly the reduction in the cost of handling ore by electrical machinery. As a result of this reduction there are thousands of tons of ore on the docks along Lake Erie that is no longer available, due to the fact that the cost of handling it with the old line machinery available, is greater than the cost of the ore, its mining, delivery at the docks, loading, transportation, unloading and transfer to cars by modern machinery. This ore has been lying on the docks for several years and bids fair to remain there for a considerable time longer, although it would appear to the writer that with a contractor's shovel, it might be made available for use at a price equal to or less than the price of new ore as at present delivered at the docks.

The authors in their paper state that "the type of mill and method of drive employed, determine to a very great extent the characteristics of the electrical equipment." I believe they consistently could have gone a step further. A decision in favor of electric drive having been made, the inherent features of the design and the characteristic performance of mill type motors should have no inconsiderable influence on the selection of the type of mill and method of drive. I believe it will be agreed that the application of motors to mill drive has been instrumental in developing a greater fund of accurate data on rolling conditions during a little more than a decade than was collected during the preceding century of mill practice. The accurate scientific principles underlying motor design and application, as compared to the rule of thumb governing engine applications preceding the advent of the motor in the field, have created a new condition. It does not suffice to select the mill and transmission properly adapted to engine drive, and then demand of the motor advocates that they simply replace this engine with an electric motor. The design of mill, transmission and motor should be so co-ordinated that the operation of the complete unit shall approach an engineering ideal.

The authors mention several features of motor drive, among them the low pressure steam turbine, as applied to non-condensing engines. I believe that the advantages of this form of developing energy for application to mill service are not fully appreciated. It is a characteristic of the reciprocating engine, that its upper range of utilization of steam is its most efficient one, and

A discussion of an article "Buying Power for the Rolling Mill," by Brent Wiley and Wilfred Sykes, published in The Iron Trade Review, of Sept. 16, 1915.

that its lower range is rather low in efficiency. As an illustration, no one would make any particular effort to secure a vacuum of 28 inches on a reciprocating engine when his condenser was already giving him a vacuum of 26 inches. The gain in efficiency over all would be inconsiderable and not worth any material investment. On the other hand, a turbine is a most efficient type of low pressure unit. Its efficiency is greater in the lower range of the cycle than in the upper range.

A condition sometimes not recognized is seen in the case of a compound engine with a turbine attached constituting the equivalent of introducing a triple expansion engine into this system with an exceptionally efficient low pressure cylinder. Let us take a concrete example for illustration. Assume a moderate size plant with limited furnace capacity with, say, three blowing engines averaging about 1,350 horsepower output per engine, these engines to be compound and non-condensing. I believe it is a fair assumption that an engine of this size, and operating under these conditions, would average from 22 to 23 pounds of steam per horsepower hour. Let us assume 22 pounds. These engines would require approximately 89,000 pounds of steam per hour and, allowing for 5 per cent losses, would net about 84,500 pounds for use in low pressure turbines. This could be utilized with a back pressure not to exceed one pound on the engines, which should not affect their economy to any extent. Let us assume that this steam will be utilized in a low pressure turbine of 2,500 kilowatts capacity, not taking into account the power factor. Such a turbine should have a steam economy of not more than 32 pounds per kilowatt hour when operating on a 28-inch vacuum. Under these conditions the amount of steam delivered by these engines would develop a total of about 3,640 kilowatts of energy. Now, let us assume that a condenser of 26-inch vacuum is applied to the engine. A liberal assumption would be that these engines would develop a horsepower hour on 16 pounds of steam or a saving of six pounds per horsepower hour. This saving would amount to about 24,300 pounds of steam per hour on a total of 4,050 horsepower of engine capacity. This steam utilized in a 2,500 kilowatt turbine of the high pressure type, running condensing, which would have a water rate of approximately 171 pounds per kilowatt hour, would develop about 1,380 kilowatts or a net of 1,200 kilowatts in round figures, less than when used through a low pressure turbine. A small portion of this amount would be required to maintain a lower vacuum than would be necessary with the engine, but this would not exceed 5 per cent at a maximum, so that the gain would be above 1,100 kilowatts from the steam exhausted by the engine.

The authors have given, as an advantage of electrification, that it provides a means of utilizing favorable propositions from large central station companies and that the principal advantages of this are: Reduction of first cost of installation, the capital being better invested in the manufacture of steel; elimination of the power plant, giving the management a better opportunity to devote its attention to production; and the availability and reliability of central station supply under practicable operation conditions.

The first item, "the reduction of cost of installation," I believe to be entirely conditional. An injudicious selection of mill, transmission and motor may eliminate much of this advantage.

Only the managers of companies who have had the experience can fully appreciate the satisfaction that results from the ability to throw a switch and immediately start operation. A few minutes' interview with one of these experienced users of central station power will bring out some radical statements.

The merit of central station power is also admirably brought out in C. S. Lankton's paper on this subject, which is published elsewhere in this issue of *The Iron Trade Review*, his painstaking analysis showing very cogent reasons for these advantages. It might be inferred from some of the advocates of isolated plants that delays never occur when the energy is developed in the mill plants.

Greater Capacity More Reliable

I believe there is no condition under which delays and accidents can be entirely eliminated, but that the central station, with its greater experience, its more diversified load factor and the many vital interests dependent upon it, aside from its steel mill customers, is in position to deliver a reliable power supply with equal or greater continuity and success than can any isolated plant with a limited capacity.

The authors have given some of the principal reasons why steel companies are developing rather slowly as customers of the central station. I believe the authors have been very judicious in the use of their qualifying adjectives, and that an additional reason could be given, in the adherence of many mill engineers until recently, to past practice. Another deterrent is found in the incorrect and incomplete estimates of power cost given by many of the isolated plants. Mr. Lankton's clear analysis of central station conditions covers quite satisfactorily the reasons for the lower cost of central station power as against isolated plants, but when, as in the writer's experience within the last 90 days, a prospective purchaser of central station power makes an estimate of less than ½ cent per kilowatt on a plant of less than 500 kilowatts capacity, we can recognize another serious difficulty in the way of the use of central station power.

The authors have discussed at some length the relative responsibility of the mill engineers, the manufacturers of motor apparatus and the central station in the matter of applying motors to mill service, operated on central station power. There are a variety of arguments and conditions entering into a joint application such as this; but I believe that after the mill engineers have outlined rolling conditions accurately, the motor manufacturers are able to estimate with reasonable accuracy the kilowatt hours per ton of material rolled on a definie schedule. The central station on this data should present a price schedule with a minimum of complications regarding service charge, minimum and maximum demand rates, and complications of graduated rates for various blocks of metered current and obscure progressive discounts, etc.

The National Tube Co., Pittsburgh, has issued a 32-page bulletin giving a complete index of the contents of bulletins Nos. 1 to 20. The cross index system used in compiling this latest bulletin is exceptionally complete and permits the reader to locate without difficulty the description of any of the National company's products listed in the earlier bulletins. The bulletin in addition will serve to make available a wide range of information about the pipe industry.

Henry Disston & Sons, Inc., Philadelphia, have put out a 64-page book entitled "The Saw in History." In a comprehensive way it covers the development of the saw from its prehistoric origin to its present highly-perfected form. The text is supplemented with profuse illustrations. The preparation of this book involved a vast amount of research work among libaries, private records, original manuscript, etc., and the book is a valuable contribution to technical literature.

The Trussed Concrete Steel Co., Youngstown, has issued a 12-page bulletin describing briefly its complete line of metal lath, pressed steel studs, corner beads, base screeds, etc., suitable for metal fireproof building construction.

Wage Increases

And Shorter Hours Granted by New England Employers

The Reed-Prentice Co., the largest machine tool maker in Worcester, Mass., announces that it will pay its 1,000 employes a war bonus of from 10 to 20 per cent at the end of each month, depending on the length of employment. This will be in addition to regular wages and the amount will be put in separate envelopes and paid the first week of each month. The amount will be based on the gross receipts, that is, the sum of both regular wages and bonus of each man during the month just closed. In the past six months, during which time the company has been rushed with war orders, it has increased the pay of its men from time to time about 20 per cent. The company is one that has been selected by the machinists' union to make a demand for an eight-hour day and 50 cents an hour and attempts are being made to organize the shops, but the latest announcement is likely to offset any strike talk or trouble. The amount of the increase in the shops alone will reach $200,000 a year.

Morgan Construction Co., Worcester, Mass., announces that it will pay an overtime bonus to its employes, in addition to the regular bonus system established several years ago. In order to accomplish the maximum production in the plant, the company will pay a special bonus for overtime work, based upon the number of hours of overtime work put in by each man. This overtime bonus will be paid once in two weeks in special envelopes and will continue until the end of the present European war.

The strike in the Sessions Foundry Co., Bristol, Conn., has been settled and the 110 molders who went out have returned to work at increased pay. The new scale of prices effecting every employe gives increases of 10, 15, 20 and 25 per cent to workers on different patterns. The company employs over 450 men and is the third largest gray iron foundry in New England.

Employes of the New Departure Mfg. Co., Bristol, Conn., who number approximately 2,000, have declined to accept an offer made by the company and as a result the factory has been closed.

The strike in the Max Arms Co., Fairfield, Conn., has been settled and the 150 operatives have returned to work on a basis of 48 hours a week with 56 hours pay.

The Package Machinery Co., Springfield, Mass., has granted the eight-hour day to its 200 employes, making the fifth manufacturing plant in the metal industry in that city to do it within the past month. Threats of a strike were made by the employes if the eight-hour day were not granted.

National Equipment Co., Springfield, Mass., has conceded the demands of its 250 machinists who have been on strike and will hereafter operate under an eight-hour day schedule. It provides for an eight-hour day without reduction in pay, time and one-half for overtime and double time for holiday and Sunday work.

The Gilbert & Barker Mfg. Co., makers of oil tanks and pumps, West Springfield, Mass., announced to its 400 employes that, beginning Sept. 20, the plant will be operated on a 48-hour week schedule with the same pay that is now received for 54 hours. The decision of the company is entirely voluntary.

The Excelsior Needle Co., the Standard Co. and the Progressive Mfg. Co., all of Torrington, Conn., have granted to their 2,000 employes a new working schedule, providing for a 55-hour week, an increase of 10 per cent in wages, piece work prices to be adjusted as nearly as possible on the same basis, and a Saturday half holiday. Overtime pay will be adjusted or there will be no overtime.

The Torrington Mfg. Co., Torrington, Conn., has also granted a 55-hour week and an increase of 15 per cent in wages, with time and a quarter for overtime.

The employes of the rolling and mechanical departments of the Coe brass branch of the American Brass Co., Torrington, Conn., who had asked for a 50-hour week and a 20 per cent increase in wages, have accepted the 55-hour week and a 10 per cent increase in wages.

The Randolph-Clowes Co., Waterbury, Conn., whose factory has been closed, has started up again and all employes will receive 15 per cent increase in wages.

The Chase Metal Works, Waterville, Conn., has re-opened with most of the employes working.

Waterbury, Conn., aldermen have granted permission to the American Brass Co., and the Chase mills to hire 196 and 54 special constables, respectively, to police their plants. The latter already has 50 special guards on duty.

Machinists at the Rowbotham Co., and the Blake & Johnson Co., both of Waterbury, Conn., are preparing to make demands for an eight-hour day, and other concessions.

About 80 of the 90 strikers at the plant of A. H. Wells & Co., makers of tubing, Waterbury, Conn., have returned to work, as have 150 employes of the Waterbury rolling mills, the men receiving in each case a 10 per cent increase, 55 hours a week instead of 60, and time and a half for overtime work.

Restores Wages

Milwaukee, Sept. 14.—Due to the rapid improvement in business, the Allis-Chalmers Mfg. Co., Milwaukee, was able Sept. 1 to restore in full the 10 per cent cut in wages and salaries of the office forces, numbering more than 1,000. On March 1, 1915, wages were cut 10 per cent, because of business depression. Since then the company has booked large contracts, including war orders, and on July 1 one-half of the cut was restored. Now the final 5 per cent is added. The company is employing more than 5,000 people in its main works, West Allis: Reliance works, Milwaukee, and Bullock works, Norwood, Cincinnati, O.

Accidents Increase

Accident reports of the state bureau of statistics, a branch of the Pennsylvania department of labor and industry, indicate that industrial accidents increased in that state in August. Officials of the department are reported to believe that rush work, caused by war orders, is directly or indirectly to blame for a large portion of the 5,588 accidents reported in August. July had 5,083, May 5,008 and April 3,980 accidents.

It is interesting to note that more men were hurt on Wednesday than on any other day during first eight months of the year, the total accidents of that day being 5,726 against 5,648 on Tuesday, 5,560 on Thursday and 5,310 on Friday. Monday does not figure as a "bad" day. Wednesday was the worst accident day in January, April, June and July and Monday in February and May. Thursday was accident day in August. Of the total number of accidents reported, 12,586 were in the metal trades, 9,783 in repair shops and 7,604 in mines.

Houses for Employes

The New London Ship & Engine Co. is arranging for the erection of 50 houses, a moving picture theater, a restaurant, a gymnasium and a hotel in Groton, Conn., for the benefit of its employes. The houses will be arranged for one, two and three families, and will have every improvement, including heat. All of the buildings will be constructed of hollow tile. The plans have been completed by New York architects and are now in the hands of the officials of the company, who will call for estimates in the near future.

Rush Work at Minnesota Steel Plant

New Works at Duluth Will Begin Operations About November 1—Satisfactory Progress Made in Finishing Construction Work and Installing Equipment

THE NEW steel plant of the Minnesota Steel Co., at Duluth, Minn., will roll its first billet about Nov. 1, and work now is being rushed to insure the plant beginning operations at that time. The progress made in the last few weeks has satisfied officials of the company that the program outlined several months ago of rolling steel in November can be easily carried out.

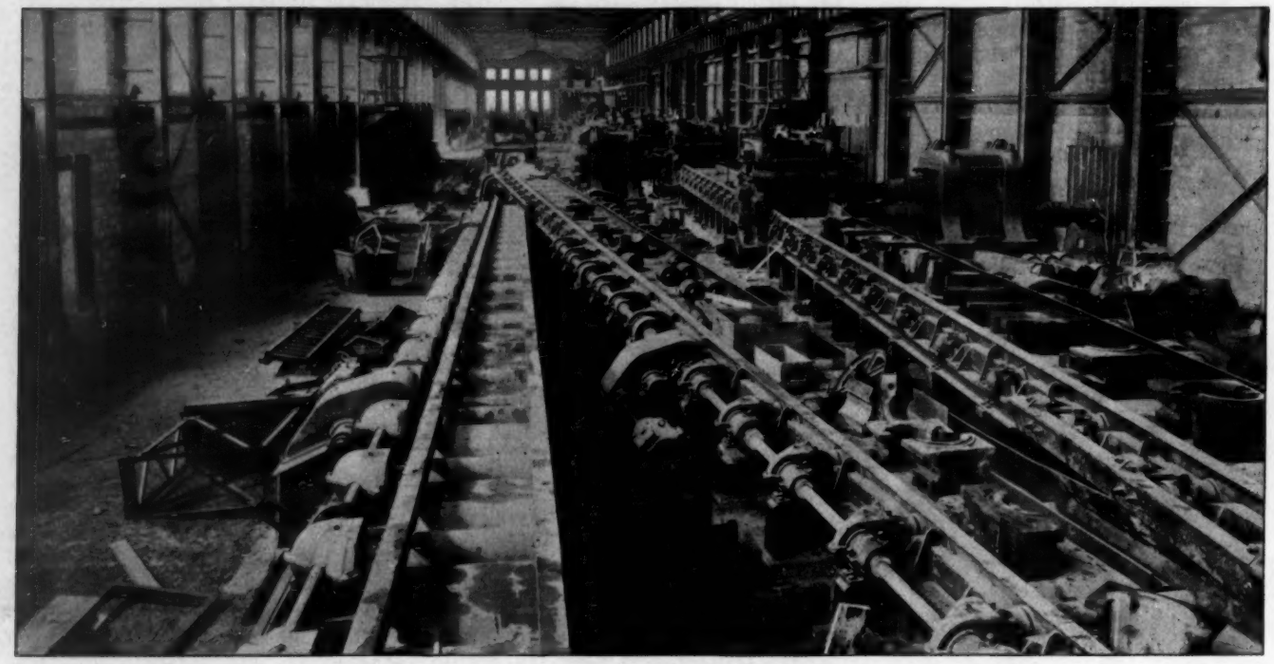
Practically all that remains to be done to put the plant on an operating basis is to test out the machinery, dry out the coke ovens, line the open hearth furnaces and install the necessary piping and fittings. Part of the plant could begin operations before the date set and work is being rushed on the portions which are not as near completion.

Progress of Work

Work on blast furnace No. 1 has advanced so far that there is no question but that it will be ready to blow in Nov. 1. The second furnace will be put in blast shortly afterward. The coke ovens are now being heated, while work also is practically completed on the coal crushing and handling equipment. Seven of the 14 open hearths are finished and require only bottoms to be ready to operate. In the finishing department, the combination rail mill, soaking pits, gas producers and continuous heating furnaces are practically completed. Work on the merchant mill has not advanced as far, although the stands, roll trains, and other heavy equipment have been installed. The mill will easily be completed before the date set. All the blowing engines have been installed and tested and the power house is completely equipped. The necessary equipment has been set up in the by-product plant, and the work of installing the lead tanks and connecting up the piping is now in progress.

This newest steel plant was described in detail in *The Iron Trade Review*, Nov. 13, 1913. Few important changes have been made in the arrangement since that time. As pointed out in that article, the directors of the United States Steel Corporation, of which the Minnesota Steel Co. is a subsidiary, originally contemplated a plant costing $6,000,000. Work was started in 1907, but until 1910 little progress had been made with the exception of building and equipping a small power house. Several of the larger buildings were put up in 1910 and since that time rapid progress has been made in constructing the buildings and installing equipment. The original plans have been greatly enlarged and the cost of the plant will largely exceed the first estimate.

The plant includes two 500-ton blast furnaces, 90 Koppers coke ovens, 10 75-ton open hearth furnaces with space provided for the installation of four more, four 4-hole soaking pits, a steam-driven 40-inch blooming mill, a 28-inch and 18-inch combination rail, structural and heavy bar mill, a 16-inch continuous roughing train, 8-inch, 10-inch and 12-inch merchant mills, gas-fired heating furnaces, a by-product plant for making ammonium sulphate and concentrated liquor, power generating apparatus, coal and limestone storage yards, pumping and auxiliary equipment.



COMBINATION RAIL, STRUCTURAL AND BAR MILL IS PRACTICALLY COMPLETED

The Minnesota company will manufacture rails, track fastenings, shapes and bar products of all kinds, including beams up to 8 inches, channels up to 10 inches and angles up to 6 x 6 inches. The total annual output of finished material will be about 350,000 tons.

Storing Coal and Limestone

Owing to its proximity to the ore fields, no provision has been made for large ore storage and the iron ore

will be handled direct from cars. To avoid possible delays through frozen ore, a heating plant has been erected in which the ore will be thawed out in the cars. It was necessary, however, to provide large storage capacity for coal and limestone. This storage yard is 1,650 feet in length over all and 662 feet in extreme width. The excavation work has been completed and two traveling 6-ton bridges furnished by the Mead-Morrison Mfg. Co., Boston, have been set up. These bridges have a span of 382 feet 6 inches with an overhang on either end of 139 feet 9 inches. Large shipments of raw materials have already been received.

In general, the big squad of workmen now employed at the plant is engaged in finishing the installing of equipment. The major construction and installation work has been completed and the next six weeks will be devoted to testing out the machinery and making the necessary piping connections.

Plant Furnace Nearly Ready

On the blast furnaces, the runners are being built in and the piping fitted up. The stoves, which are of the three-pass McClure type, are lined and the work now is confined to setting and packing valves and work of similar nature. In the by-product division, the principal work remaining is the lining of the saturators with lead and connecting the necessary fittings. All the gas lines to the by-product building have been finished. Three Buckeye engines have been installed and are ready to operate.

The by-product coke ovens are ready to operate and are now being heated. These ovens have a capacity of 1,500 tons a day on 16-hour coke and 1,100 tons on 19-hour coke. For handling coal, a Bradford breaker together with the necessary conveyors has been installed. The coal is dumped into hoppers and runs on conveyors to the breaker. From the breaker it is conveyed to a Williams crusher where it is crushed and then is ready for the coke ovens. It is crushed fine enough so that 80 per cent will pass a ⅛-inch screen. The buildings housing this equipment have all been built and most of the equipment installed. The coal mixer is completed but for setting the motor. The main power plant is also practically ready for operation. The equipment already installed includes four 3,000-kilowatt, twin-tandem, gas-driven generator units furnished by the Allis-Chalmers Mfg. Co., Milwaukee; five single-tandem Bethlehem blowing units; one Snow gas engine connected to the air compressor; and motor generators and other auxiliary apparatus.

Several of these units are operating. The work in this department is confined to drying out the generators, and testing out the various units.

Seven Open Hearths Completed

Work is also well advanced in the open hearth department. Seven of the furnaces are ready to be dried out and the bottoms put in. The foundations and regenerative chambers are completed for three additional furnaces. Little work remains to be done on the 600-ton hot metal mixer but putting in the lining. The open hearth stock house is completed. Between the furnace and the stock house are located 28 10-foot Wellman-Seaver-Morgan gas producers arranged in two batteries of 10 and one battery of eight. One large battery is now operating and is furnishing gas for the power house. Seven of the waste heat boilers are completed, one 437-horsepower boiler being connected to each open-hearth furnace.

The four 4-hole soaking pits are practically ready to operate and the last brick work is being laid. The four Wellman-Seaver-Morgan 10-foot gas producers for supplying gas for combustion in the pit furnaces are finished. The tables for the blooming mill are installed, the bloom shears are practically completed and this mill could be placed in operation in a few days.

SEVEN OPEN HEARTH FURNACES ARE READY FOR BOTTOMS

Progress on Mills

The three 18-foot continuous heating furnaces for heating blooms destined either for the merchant mill or the rail and structural mill are erected and are now being lined. The rotary transfers are installed. All of the roll stands and tables for the 28-inch combination rail mill are in place and several days' work on the hot beds will put this mill in finished shape. This mill will be used for rolling shapes as well as rails and interchangeable rolls have been provided.

In the merchant mill the stands for the 16-inch, 12-inch, 10-inch and 8-inch mills are erected and the tables also

SOAKING PITS WILL BE COMPLETED IN A FEW DAYS

are practically completed. Considerable work remains to be done in fitting up the auxiliary equipment in this mill. The transfer tables between the 28-inch mill and the rail and structural and bar finishing departments are not finished. The machinery for the finishing building has been received but has not been set up. The 6,600-volt Westinghouse, three-phase motor for driving the rail mill has been installed.

The pumping station is ready for service. The complete repair facilities, including forge, fabricating and machine shops, have been in operation for several years. They are provided with their own power plant, which also has been in service for some time. The cranes for all of the departments were placed in service some time ago.

Work on the plant has been speeded up during the past few weeks in order to insure early operation. As outlined in *The Iron Trade Review*, Sept. 9, the plant at first will roll billets and blooms which will be forwarded to the mills of the Illinois Steel Co., at Gary, Ind., South Chicago, Ill., and Milwaukee and to the Waukegan, Ill., plant of the American Steel & Wire Co., to be rolled into bars and other products.

The cement plant being built close to the steel works by the Universal Portland Cement Co. will probably begin operations about April 1. Construction work at this plant has been held back, as it was not considered advisable to put the works in service until a large amount of slag had been accumulated from the operations at the steel plant.

The Toledo-Ford Tire Co., Toledo, O., has begun a 50 x 150 brick and steel addition to its factory on Western avenue, Findlay, O. This will give the company a daily capacity of 400 tires.

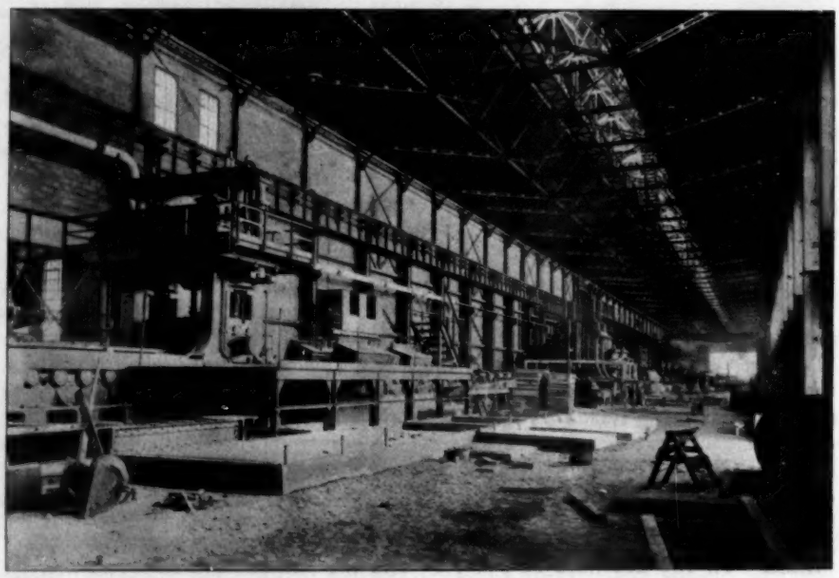
Engineers' Program

The following program has been announced by Elmer K. Hiles, secretary of the Engineers' Society of Western Pennsylvania: Tuesday, Sept. 28, "Layout of Outside Plants for Coal Mines", by W. A. Weldin, engineer, Pittsburgh Coal Washer Co., Pittsburgh; Tuesday, Oct. 5, "Gas Welding and Cutting"—a symposium; Tuesday, Oct. 19, "The Mathematical Treatment of the Elastic Arch", by Willis Whited, bridge engineer, state highway department, Harrisburg; Tuesday, Nov. 2, "Highway Bridge Floors", by Charles M. Spofford, professor of civil engineering, Massachusetts Institute of Technology, Boston; Tuesday, Nov. 16, "The Microscopical Study of Steel and Micro-Metallurgy," by W. C. Post, assistant metallurgical engineer, Illinois Steel Co., Chicago; Tuesday, Nov. 23, "Utilization of Iron and Steel Works' Slag", by E. C. Brown, chief civil engineer, Carnegie Steel Co.

Pipe Making in Pictures

A series of three industrial motion picture films, illustrating the manufacture of "National" pipe from iron ore to finished product, will be shown before the Cleveland Engineering Society, Sept. 28, in the auditorium of the East Technical high school. These pictures were taken under the direction of the National Tube Co. after eight months' work and involved a large expenditure of money. Engineers, architects, plumbers and others interested in the manufacture of pipe are invited to attend.

A "Booster Dinner" was held last week at the Hotel La Salle, Chicago, by the American Association of Engineers. W. D. Wilcox, president, was toastmaster. He spoke briefly of the aims of the association. Professor W. L. Newell presented a paper on "The Engineer Awakes" and Garrison Babcock delivered an address on "The Working Engineer". The first annual convention of the association will be held at Chicago Dec. 10 and 11. An invitation has been extended to all engineering societies and clubs to attend this meeting.



GENERAL VIEW OF BLOOMING AND RAIL MILLS

Business News of Nation's Capital

Furnace Companies File Brief in Supreme Court—Argument in Steel Corporation Case is Not Near

Washington, Sept. 21.—The Buffalo Union Furnace Co. and the Wickwire Steel Co. have filed a brief with the interstate commerce commission dealing with their complaint against freight rates they have to pay for the delivery of coal and coke to their furnaces at Buffalo and Harriet, N. Y. They claim they are being discriminated against to the advantage of Rogers, Brown & Co. in the matter of rates which the latter have to pay for the delivery of coke to their furnaces at Buffalo. The brief says that Rogers, Brown & Co. pay only $1.05 per ton on coke from Tyler and Sykes, Pa., and that the same persons are interested in Rogers, Brown & Co. that are interested in the coke plants at Tyler and Sykes, virtually all of whose output goes to Rogers, Brown & Co. It is asserted that the complainants have to pay $1.45 for transportation of coke from other producing points in Pennsylvania which are no further from their furnaces than Tyler and Sykes are from the Rogers, Brown & Co. stacks. The same rate, it is contended, should be established. The alleged discrimination is said to be due to a contract entered into between the Pennsylvania railroad and the Buffalo & Susquehanna railroad corporation. The brief says because of the higher rates which the complainants have to pay, they are placed at a disadvantage of 50 cents per ton in the manufacture of pig iron. The Buffalo Union Furnace Co. seeks reparation of $200,000 and the Wickwire Steel Co. $125,000.

Effects of War

Washington, Sept. 21.—According to the bureau of insular affairs, war department, the Philippine foreign trade movement for the year ending June, 1915, showed an adverse effect due to the European war. Imports amounting to $44,479,861, declined $11,500,000, or 20 per cent below the 1914 value, and though exports were only nominally less than the $51,000,000 total of the previous year, greatly increased production of copra alone saved the total, while the high price for sugar was the only marked war benefit in an export trade that was generally reduced. While importations were subject to general reductions throughout, the exceptionally large $10,000,000 iron and steel trade of 1914 decreased most noticeably and amounted to but $4,000,000 in 1915. It was, however, more exclusively American than ever before—imports from the United States amounting to 78 per cent. The imports continued to decline and were still smaller in the latter half of the year.

Save the Nation!

Washington, Sept. 21.—Attorney General Jones, of Arizona, has filed a brief with the United States Supreme Court in which he declares that the very welfare and preservation of the nation demanded that only American citizens be employed in the copper mines of Arizona. Copper was referred to as war material. According to the Arizona law, it is a crime for an employer of more than five workmen to employ less than 80 per cent qualified electors or native born citizens. A lower court held the law unconstitutional. Organized labor, said to have been responsible for passage of the act, is hoping to see the Supreme Court reverse the lower tribunal. The case will be heard by the Supreme Court next month and because of international complications involved, it promises to be unusually important.

Not This Year

Washington, Sept. 21.—Attorney General Thomas W. Gregory is of the opinion that argument in the United States Steel Corporation dissolution suit cannot be made before the United States Supreme Court earlier than next spring. The appeal from the decision of the circuit court of appeals, which dismissed the case, will be filed in the near future. It will be necessary to summarize the evidence, brief the case and prepare the argument before it can be pleaded before the court. Because of the tremendous amount of testimony in the case, it will require much work and time to condense it.

Extending Trade

Washington, Sept. 21.—According to a statement issued today by the bureau of foreign and domestic commerce, recent orders pending in Harbin, Manchuria, for American goods include, among other things, railroad supplies. The bureau advises that it has gathered considerable data about Manchuria for all American manufacturers who want to know. American commercial travelers, according to the statement, are now penetrating far into northern Manchuria. Consul Moser reports that he is busy introducing American trade solicitors to Russian firms. The consul says he endeavors to be personally acquainted with the managers of every importing firm in his district. When the American commercial travelers arrive at Harbin, the consul introduces them and gives them useful information. Some large orders for American goods have been placed recently through this source.

Increases Plant Capacity

A rapid growth in the demand for boiler making, bridge, shipbuilding and structural tools has necessitated an addition to the manufacturing facilities of the Cleveland Punch & Shear Works Co., 3917 St. Clair avenue, Cleveland. A third story now under construction on the main building of the plant will add 9,280 feet of working space. Specially designed machinery for the manufacture of punches, dies, rivet sets, chisel blanks, much of it manufactured by the company, will be installed. The new story will be 116 feet long and 80 feet wide, the same dimensions as the present building, and will have a ceiling height of 17.3 feet. It is to be of modern saw tooth construction, with brick walls and steel sash. C. W. Courtney is engineer in charge of the new construction. The company, which employs more than 200 men, has been hampered by lack of sufficient working space to handle its increasing number of orders. The ground floor at present being utilized principally for stock, the new addition will practically double the available manufacturing space.

Explodes After Many Years

Chattanooga, Tenn., Sept. 21.—A shell fired into Chattanooga during the civil war, which had lain unexploded in the ground until recently, was picked up and sold for scrap iron to the American Brake Shoe & Foundry Co. It was put into the cupola and melted with other scrap, and exploded with a terrific detonation. About $200 damage was done.

Iron and Money: Fact and Comment

Eight Banks Now Authorized to Deal in Acceptances—Interest of Wall Street Centers in Arranging Foreign Credit or Loan

Washington, Sept. 21. — Authorization by the federal reserve board for reserve banks to deal in bankers' acceptances has given aid to the import and export trade, and the regulations recently issued by the board on trade acceptances are designed to give financial stimulation to domestic commerce. These trade acceptances will furnish assistance in a form different than that which is rendered by the discount of mere commercial paper. Within the past few days the reserve board has granted discount rates on trade acceptances to four more reserve banks. Eight reserve banks are now prepared to discount this class of paper, and include New York, Richmond, St. Louis, Kansas City, Dallas, San Francisco, Boston and Philadelphia.

Trade acceptances are not common in the United States, but similar paper can be found in profusion throughout European countries. The efficient manner in which European financial systems help home business is generally known. To encourage the use of trade acceptances is therefore considered by the board to be a step forward.

The board defines the term "trade acceptance" as a bill of exchange drawn to order, having a definite maturity and payable in dollars in the United States, the obligation to pay which has been accepted by an acknowledgment, written or stamped, and signed, across the face of the instrument by the company, firm, corporation, or person upon whom it is drawn; such agreement to be to the effect that the acceptor will pay at maturity, according to its tenor, such draft or bill without qualifying conditions.

A trade acceptance to be eligible for rediscount with a federal reserve bank at the rate to be established for trade acceptances must—

1. Be indorsed by a member bank, accompanied by a waiver of demand, notice and protest.

2. Have a maturity at the time of discount of not more than 90 days.

3. Be accepted by the purchaser of goods sold to him by the drawer of the bill, and the bill must have been drawn against indebtedness expressly incurred by the acceptor in the purchase of goods.

A trade acceptance must bear on its face, or be accompanied by evidence in form satisfactory to the federal reserve bank, that it was drawn by the seller of the goods on the purchaser of such goods. Such evidence may consist of a certificate on or accompanying the acceptance, to the following effect: "The obligation of the acceptor of this bill arises out of the purchase of goods from the drawer." Such certificate may be accepted by the federal reserve bank as sufficient evidence; provided, however, that the federal reserve bank, in its discretion, may inquire into the exact nature of the transaction underlying the acceptance.

The following shows the reserve banks now willing to discount trade acceptances with the rates and maturities:

	To 60 days, inclusive.	Over 60 to 90 days, inclusive.
Boston	3½	3½
New York	3½	3½
Philadelphia	3	3
Richmond	3½	4
St. Louis	3½	3½
Kansas City	3½	3½
Dallas	3½	4
San Francisco	3	3½

Rates on trade acceptances are considerably lower than they are on commercial paper. On commercial paper reserve banks making discounts charge 3 per cent on maturities of 10 days and less and 4 per cent, except in the case of San Francisco, which charges 3½ per cent, on maturities of over 10 to 30 days and 4, 4½ and 5 on maturities of over 60 to 90 days. On agricultural and live stock paper, over 90 days all the banks charge a uniform rate of 5 per cent.

An opinion recently handed down by M. C. Elliott, counsel for the federal reserve board, made plain a distinction between a bank and a trade acceptance. Explained in other terms, yet without misinterpreting the example, the following is cited:

A domestic corporation enters into a contract to furnish material to a domestic steel company to be used by the latter in the manufacture of products which the steel company is under contract with a foreign purchaser to export. The query arose as to whether a national bank can accept a draft or bill of exchange drawn by the company furnishing material to the steel concern and accompanied by the necessary documents. In other words, assuming that such an acceptance complies with the other necessary provisions of law and the regulations of the board made pursuant thereto, can such an acceptance be said to be based upon the importation or exportation of goods? Counsel Elliott held that such transaction as this does not give rise to a banker's acceptance, claiming there is no privity of contract as between the foreign purchaser and the first named corporation. But under the new regulations it is a trade acceptance and can be discounted by a reserve bank. This is aimed to help bankers who lend money to manufacturers and to give the bankers more financial resources, which, in turn, can be supplied to other manufacturers or others engaged in trade.

May Resume

St. Louis, Sept. 20.—It is reported upon reliable authority that the Germania Refrigeration & Machinery Co., Belleville, Ill., whose plant has been closed down several months, will be opened again soon. Creditors of the company, representing about $21,000 of unsecured claims, met in St. Louis last week, but withheld definite action pending a report of a committee which is seeking to resume operations at the plant. It is the aim of the committee to lease the plant to a new company. A final report will be made within 10 days.

Never Earned a Dollar

Trenton, N. J., Sept. 21.—Vice Chancellor Backes has handed down a decision holding that the machinery, cranes, furnaces and all appliances used in the manufacture of steel by the New Jersey Steel Co., of Rahway, N. J., are real estate. This overrules the position taken by Receiver Charles H. Holcombe. The history of the steel company whose property is to be sold Sept. 30, as disclosed by the recent testimony taken before the vice chancellor, adds another interesting chapter to the story of high finance in which the American Finance Co., of Philadelphia, was involved. The New Jersey Steel Co. was one of the chain of concerns through which the finance company floated a large amount of securities.

The actual property of the steel company is roughly rated as worth about $100,000. Against this there is a mortgage for $250,000 to secure a bond issue for a like amount; $150,000 of outstanding preferred stock and a

floating indebtedness of $454,000. This floating indebtedness is held by the American Finance Co., which is also in the hands of a receiver, and which sold the bonds and preferred stock of the steel company. The Finance company for several years not only paid the interest on the bonds, but also dividends on the preferred stock, although it appeared that the company had never earned a dollar.

Industrial Stocks

The attention of Wall street was concentrated to a large extent last week on the efforts being made to establish an immense credit for England and France and on the whole the street was well pleased with the progress that was made. There were, however, some other interesting features in the market.

Beginning with Monday, there was an upward tendency, and on that day Bethlehem advanced 23 points, to 335, while the general list made some progress. The report of the conference between Secretary Lansing and Ambassador Bernstorff had good effect. Tuesday Bethlehem Steel made a new record at 349½; Crucible Steel exceeded its best record by 3 points, and General Motors made an important advance. Following its recent bad report, American Locomotive regained a point and at the close stood 1¼ higher than on Saturday, before the report of its year was published. Steel common touched 76, but declined to 75¼. Official reports from Washington indicated a drop of $27,000,000 in exports for the preceding week as compared with the week before that. This loss was attributed to depreciation of foreign exchange. Wednesday cotton and war shares advanced. There was disposition to select new favorites. Thursday the market was somewhat irregular. An interesting feature was the appearance of Colorado Fuel & Iron Co. as a new leader. This company's stock, on transactions in excess of 69,000 shares, advanced 5⅞, net, and at one time during the day stood at 54, or nearly 6 points above the previous high point for the year. There was no satisfactory explanation for this sudden advance of Colorado, which continued the leader on Friday, when sales exceeded 83,000 shares. Improvement in the prospect for arranging the foreign loan had a good effect on the general situation Friday and Saturday. On the latter day, the announcement of a 50 per cent cash dividend by the General Motors Co. had a stimulating effect.

Quotations at the close of business Sept. 18 and changes in the leading stocks identified with the iron and steel industry for the week are shown in the following table:

	Close Sept. 18.	Net chge.
American Can	60¼	+4¼
American Can, prfd.	104⅞	+1¾
Amer. Car & Fdy. Co.	71	+4
American Locomotive	57¼	+5¼
American Locomotive, prfd.	100	+2½
American Steel Foundries	56	+4½
Baldwin Locomotive	81	+2
Baldwin Locomotive, prfd.	106⅛	+ ⅛
Bethlehem Steel	344	+32
Bethlehem Steel, prfd.	160	—6¼
Colorado Fuel & Iron	55¾	+10⅛
Continental Can	85⅜	—3⅛
Crucible Steel	93¾	+8
Crucible Steel, prfd.	106	+1¾
General Electric	172½	+2
International Harv. of N. J.	107	+2
International Harv. Corp.	70	— ⅜
Lackawanna Steel Co.	69½	+2¼
Nat'l. Enamel'g & Stamp. Co.	27	+2⅛
Nat'l En. & Stp. Co., prfd.	89	.....
Pressed Steel Car	62	+3
Pressed Steel Car, prfd.	98½	—1⅛
Pullman Palace Car	160¼	+1¼
Republic Iron & Steel	45⅞	+3⅝
Republic Iron & Steel, prfd.	100	+2⅛
U. S. Cast Iron Pipe & Fdy.	22¾	+1¾
United States Steel	75⅛	+1⅝
United States Steel, prfd.	113¾	+ ⅛
Westinghouse Mfg.	118⅜	+ ⅛

The following show changes in maximum quotations of stocks not listed on the New York stock exchange.

	High for Sep. 10.	High for Sep. 17.
American Radiator	360	360
American Ship Building	40⅛	38½
Cambria Steel	64⅜	65
Chicago Pneumatic Tool	78½	86
Inland Steel	....	245
LaBelle Iron Works	40	40⅝
Lake Superior Corporation	11¼	12
Penn. Steel, prfd.	85¾	40½
Stewart-Warner Speed. Co.	65	67
Warwick Iron & Steel Co.	10¼	10¼
Westinghouse Air Brake	141½	141½
Westinghouse Elec. & Mfg. Co.	58	58½

Financial Notes

Col. George Pope, receiver of the Pope Mfg. Co., in Connecticut, has filed his report for August. It shows that on the close of the month, the receiver, after having paid out $134,328.28, had $51,770.45 on hand. The cash receipts for the month were $13,978.63. The dividend to creditors amounted to $132,226.74. Since Aug. 28, 1913, the receiver has received $1,711,532.81.

Mechanical Engineers Meet

A. S. M. E. Opens Session at San Francisco—

Many Interesting Papers Presented

San Francisco, Sept. 21 (By wire).—The September meeting of the American Society of Mechanical Engineers opened here Thursday of last week. The Panama-Pacific International Exposition, coupled with the unusually interesting series of papers that had been announced, proved attractions that brought out a large attendance.

The opening session on Thursday morning was held in the Hall of the Native Sons of the Golden West. F. W. Gay, chairman of the local committee, introduced C. C. Moore, president of the exposition, who made the welcoming address. Dr. John A. Brashear, president of the A. S. M. E., responded. The "Engineering Features of the Panama-Pacific International Exposition" were discussed in a paper presented by G. L. Bayley. G. W. Dickie presented a paper on "Mechanical Engineering at the Exposition." Both papers were followed by interesting discussions.

Following a luncheon at Old Faithful Inn, tendered by members of the committee on local affairs, the afternoon session was opened in the Court of Abundance. A commemorative medal was presented to the society by President Moore, Dr. Brashear responding. W. F. Durand discussed "Achievements by Engineers During the Last Century", pointing out the large share borne by engineers in bringing about the marvelous industrial development of this country. In the evening, the members enjoyed a dinner dance held in conjunction with the American Society of Civil Engineers and the American Institute of Electrical Engineers.

At the Friday session, over which Vice President Dickie presided, three papers were presented. A. H. Goldingham discussed "The Heavy Oil Engine, Its Present Status and Future Development." The paper on "The Diesel Engine and Its Application in Southern California", by W. H. Adams, was read by the secretary. G. H. Marx and L. E. Cutter presented a paper on "The Strength of Gear Teeth." This paper was a continuation of the report made to the society in 1912.

On Saturday and Sunday, the visiting mechanical engineers were taken to various points around San Francisco, where the features of interest to engineers were inspected.

Permission has been granted the Baldwin Locomotive Works by the Commissioners of Navigation, Philadelphia, for the erection of a pier in the Delaware river at Eddystone, Pa. This pier is planned to facilitate the export of shipment of war munitions for which the company has large contracts. Vessels drawing 26 feet of water will be accommodated.

Welfare Work on the Lakes

Assembly Rooms With Club Privileges, and Claim Funds Provided for Mariners by Lake Carriers' Association

The June number of the *Monthly Bulletin* of the American Iron and Steel Institute is devoted in its entirety to the welfare work as carried on by the Lake Carriers' Association on board its ships. This work has been going on for a period of six years and it is significant that the leading industrial organization of the United States should have seen fit to devote an entire issue of its periodical to the work.

The Institute has gone into the work most completely and the recital as embodied in its *Bulletin* constitutes the entire history of the plan up to date. It begins with an account of the early lake traffic, tracing it from its small beginnings up to its present immense volume.

Incidentally the origin of the Lake Carriers' Association is touched upon with the influence which contributed to its formation. The Lake Carriers' Association has existed in one form or another since 1882, and was organized chiefly to take up matters of common interest, such as securing the establishment and maintenance of aids to navigation, the improvement of channels, and to establish and maintain places for the convenient securing of seamen for the vessels of the Great Lakes.

When Union Failed

The ground work of the welfare plan was laid out in 1902, though it was not until 1909 that it was actually put into effect. During the intervening years, the unions undertook to supply the ships with men and to carry out the principles embodied in the plan, but the result was absolute failure.

The plan in general includes the establishment at various ports of assembly rooms for the convenience of seamen. These rooms are clean and attractive, and are furnished with current newspapers, magazines, books and writing material. They are in effect club rooms, where the seamen leave their belongings, bathe, change their clothes and make their headquarters the same as at any other club. For this privilege the sum of $1.00 per annum is charged. All money so derived is expended exclusively upon the rooms.

Certificates are issued to the seamen upon their own representation as to previous service, and at the same time the seaman is given a record discharge book bearing the same number as the certificate, which he deposits when he signs articles with the master or engineer. In his discharge book the master or engineer, at the termination of the seaman's service, enters a record of its character, but the entry is confined to the word "good" or "fair". The book is then returned to the man. If such entry cannot justly be made, such as in the case of desertion or failure to serve after being engaged, the book is returned by the master to the secretary of the association with a statement of the facts in the case.

Death Claims

In the event of death from accident, sums ranging from $75.00 in the case of an ordinary seaman, to $500.00 in the case of the master, are made immediately available to the family, relative or friend, to meet emergency expenses and this without reference to any legal claim of liability concerning the accident. In the case of shipwreck, money is also immediately available for transportation for each man to port of shipment, and for the restitution of lost effects.

This is the general outline of the welfare plan, and it has been working admirably since it has been put into effect. There are about 12,000 men employed aboard lake ships during active season and as their general habit is to shift from ship to ship, there are from 2,000 to 3,000 men on dock at all times. The sheltering of these men is, therefore, an important consideration. The rooms are intended as places of rendezvous for the men during sailing season, and while they are in no sense of the word employment offices, the men naturally gravitate there when seeking employment, because the practice of the master and chief engineer is to look to the shipping commissioner in charge of the assembly rooms to fill any vacancies in the crew.

Through the operation of the welfare plan, the Lake Carriers' Association has been enabled to do a great deal of good for the men. This was conclusively proved in the great storm of November, 1913. Through the system of registration in the welfare plan, the association was enabled to name every man upon the lost vessels, to ascertain his home address and the address of a relative or friend. It was possible, also, from the partial description which the records contained of each man, to identify the bodies as they were recovered and to communicate with the relatives as to the disposition of the remains. Moreover, the relief fund which was raised on that occasion was distributed with an exact knowledge of the requirements of each family.

During the winter period, the assembly rooms reach their maximum efficiency. Night schools and classes in seamanship are conducted in them and entertainments are given for the benefit of the men. All of the rooms are supplied with cards, checkers, chess and some have pool and billiard tables. All of them have Victrolas with a circulating library of well assorted records.

As the years have gone by, other lines of welfare work have developed until it is now of far reaching proportions. Foremost among the movements has been that of Safety First. No effort has been spared to bring home to every member of the crew that safety is the first consideration. Everything has been done that can possibly be done to awaken the conscience of the individual as to his personal responsibility. For instance, during 1914 the Pittsburg Steamship Company gave pennants to the forward and after ends of the ship, with the understanding that they were to remain flying so long as no injury occurred which involved the loss of time to the individual. As soon as a single injury occurred at either end of the ship, which involved the loss of time the pennant for that particular end of the ship came down and was not flown again during the entire seasan. If the ship came through the season without any injury to the members of the crew, the second mate got $25.00 and the second engineer $25.00. Through this simple device the Pittsburg Steamship Co., during 1914, reduced its personal injury cases by 68 per cent., though its personal injury record for previous years had been as good as anybody's. Dangerous places on board the ship are distinctly marked, and the association has an industrial committee composed of masters and chief engineers working on this feature at all times.

How Money is Saved

Under the welfare plan the men have been encouraged to save their money and in order to enable them to do so a simple system of banking the money on board ship has been devised. In paying off, the men simply indicate the proportion that they desire to save, and the master makes a draft on the owner for the amount and forwards it to the bank, where it is credited to the sailor's account.

The sums which are deposited by the men are surprising. During the first four months of the present sailing season the men aboard the Lake Carriers' vessels have deposited nearly $1,000,000 in one bank. Care has been exercised to

see that the food supply is sweet and wholesome and the drinking water free from contaminating influences. Circulars have been issued to the supply houses regarding the care of milk, ice, meat and provisions, while the drinking tanks can only be filled from definitely defined areas as designated in charts of the lake.

This campaign on sanitation has already borne fruit. Out of 15,000 men employed on the vessels during 1914, only 11 cases of typhoid developed and there was little reason to believe that some of these had their inception aboard ship. Among the most significant outgrowths of the welfare plan was the spontaneous recommendations of the committee of captains and engineers that temperance should be encouraged among the crew and should be made a consideration for promotion. The committee recommended that notices be posted to the effect that drinking be prohibited on board the boats and that no person be allowed to carry liquor aboard a vessel.

These notices have been conspicuously posted on board and the result has been something startling. The number of accidents attributable to intoxication was reduced 75 per cent during 1914.

Hold Engineering Congress

More Than 1,500 Delegates Attend First Sessions of Joint Meeting of Engineers

San Francisco, Sept. 21. (By wire.)—The International Engineering Congress held its opening sessions Monday with more than 1,500 of the leading engineers of the country in attendance. The meetings are being held in the Auditorium building of the Panama-Pacific International Exposition. Dr. W. F. Durand, chairman of the committee on local affairs, opened the session with a brief review of the work done by local engineers in organizing the congress. This committee has succeeded in securing the co-operation of the national engineering societies and 3,000 members had been enrolled, representing 18 countries.

General Goethals, honorary president of the congress, was greeted with prolonged applause when he took the chair. Addresses of welcome were delivered by James Rolph Jr., mayor of San Francisco, and Chas. C. Moore, president of the Panama-Pacific International Exposition. General Goethals at the afternoon session, which was devoted to discussion of the Panama canal, gave a history of the building of this great waterway. Papers covering the canal were presented as follows: "Commercial and Trade Aspects of the Panama Canal", by Emory R. Johnson; "The Working Force of the Panama Canal", by Capt. R. E. Wood; "Purchase of Supplies for the Panama Canal", F. C. Boggs; "Outline of Canal Zone Geology", Donald F. MacDonald; "Climatology and Hydrology of the Panama Canal", by F. D. Willson. These papers were read in abstract only as several of the authors were absent.

Arrangements had been made for presenting the John Fritz medal to Dr. James Douglass, but owing to his being in poor health the presentation was postponed.

At the afternoon sessions addresses were delivered by the following foreign delegates: J. L. Pulligny, France; J. B. Challies, Canada; J. R. Villalon, Cuba; Admiral H. Wei Han, China; Fernando Cruz, Guatemala; M. Kondo, Japan; H. J. E. Wenckebach, Netherlands; Alejandro Canton, Nicaragua; Senor Lasarte, Spain; Richard Bernstrom, Sweden; A. E. Rhon, Switzerland.

A reception was tendered Monday evening by the local committee at which the officials, delegates and members of the congress were guests. The session arranged for Wednesday afternoon was postponed in order to permit the delegates to visit the exposition and attend special exercises to be given in honor of Dr. John Brashear, president of the American Society of Mechanical Engineers.

A banquet will be held at the Palace Hotel Friday night. On Saturday afternoon those in attendance will inspect the engineering work along San Francisco's water front. They will be guests of the state harbor commission.

The number of delegates in attendance is expected to be largely increased during the week.

Alliance Machine Co. Orders

That business conditions with The Alliance Machine Co., Alliance, O., are again normal is shown by a glance at its order book, indicating that it has an average of an order of a crane a day for July and August, and as its business is largely received from the more prominent industries, it indicates a most satisfactory condition.

Among the more prominent orders which are entered lately, the following are noted:

Five large traveling tower jib cranes for the Maryland Steel Co. at Sparrows Point.
Two 40-ton cranes and one 60-ton ladle crane trolley for Bethlehem Steel Co.
One 150-ton and two 50-ton ladle cranes, together with 12 5-ton standard traveling cranes for the Jones & Laughlin Steel Co.
One 75-ton and one 125-ton ladle crane, together with a 25-ton crane for the Broken Hill Proprietary Co.
One each 75-ton and 125-ton ladle cranes for the Republic Iron & Steel Co., for which it is also building one of its coke pusher and leveling machines.
One special charging machine for the American Spiral Pipe Works.
One 30-ton crane for the American Steel Foundries.
One 20-ton 61-foot span and two 20-ton 100-foot span cranes for the Cambria Steel Co.
Two gantry cranes for the Australian government.
One charging machine for the Firth-Sterling Steel Co.
One 20-ton crane, 60-foot span; one slab charger, one 20-ton crane, 77-foot span; two 10-ton cranes, 77-foot span; one special bucket crane, one 15-ton crane, 69-foot span; one 5-ton crane, 39-foot span, all for a prominent steel company, the name of which is not given.
One 40-ton and two 10-ton cranes for the United Steel Co.
One 5-ton crane for the Heppenstall Forge & Knife Co.
One 5-ton crane for the Ohio Seamless Tube Co.
One 5-ton crane for the American Conduit Mfg. Co.
One 10-ton crane for the M. H. Treadwell Co.
One 5-ton, 115-foot span crane for the Pittsburgh Steel Products Co.
Two 15-ton cranes for the Petroleum Iron Works Co.
One 20-ton crane for the Alliance Structural Co.
Two 6-ton cranes for the United States Aluminum Co.
One each 5 and 10-ton cranes for the Whitaker & Glessner Co.
One 6-ton crane for the Pittsburgh Plate Glass Co.
One 40-ton and two 3-ton cranes for the Alliance Engineering Co.

The company's hammer department also shows activity and orders for 12 hammers have been entered lately.

Will Buy Castings

The Falls Machine Co., maker of automobile engines, Sheboygan Falls, Wis., has booked orders calling for the delivery of 12,000 motors by Sept. 1, 1916. Four thousand are for the account of the Grant Motor Co., Findlay, O.

In order to meet this extraordinary demand, the Falls company is making radical changes in its plant, one being to discontinue all foundry work and contracting for cylinder and other castings with outside gray iron founders.

The company's present large foundry is being dismantled and made into a machine shop. A large assembling shop is under construction. Contracts have been made with foundries at Muskegon, Mich., Manitowoc, Racine and Grafton, Wis., for the supply of castings. The company is in the market for a considerable list of machine tools.

Early Delivery Clause Checks Trade

Bethlehem Steel Co.'s Inquiry Still Pending—Crane Market Unusually Active—Heavy Mill Equipment Purchased in Pittsburgh

FRANCE and England continue to flood the eastern market with inquiries. The essential requirement is that orders be filled by Jan. 1. In some cases, however, later deliveries have been accepted. Representatives of the French government during the week were able to pick up about 100 lathes for December delivery and it is understood these will be supplied by Cincinnati builders. The Cincinnati shops now are practically sold out for this year. England recently inquired through J. P. Morgan & Co. for 1,000 lathes, for early delivery. Finding it impossible to obtain these from the larger builders it resorted, as stated in last week's *Iron Trade Review*, to picking up odd lots wherever they could be found. It is still doubtful how many machines were obtained in this way, but it is known it was in excess of 100. A recent inquiry for 100 engine lathes from a New York buyer, which is still pending, is believed to be intended for shipment to Roumania. Domestic buying of machine tools, outside of the munition plants, is unimportant. The railroads are doing very little. The Pennsylvania Steel Co. has been buying some tools recently for its improvements at Steelton. The Bethlehem Steel Co. took a few tools in the week but its large inquiry still has not appeared. A planer, several lathes and other tools have been bought for the Brooklyn navy yard. The Fore River Shipbuilding Corporation has out a good list of tools, including about 20 punches and shears and other machines.

Crane Market is Active

The Alliance Machine Co., Alliance, O., has taken a 40-ton traveler and charging machine for installation in the Saucon plant of the Bethlehem Steel Co. The Southern Pacific has ordered a 160-ton, two 15-ton and a 10-ton crane and some tools. The Maryland Steel Co. is a prospective buyer of about 12 cranes for the shipyard enlargement at Sparrow's Point, Md. There has been considerable buying of locomotive cranes recently for export. France closed for 10 to 15 within a week and Russia recently bought between 20 and 30. It is understood these cranes are for handling heavy supplies for the railroads and for the front.

In addition to the closing of the 26 cranes by the Wm. Cramp & Sons Ship & Engine Building Co. with two builders as reported in *The Iron Trade Review* last week, four 10-ton Shaw cranes were taken. The Cramp yard is expected to buy additional cranes, particularly walls jibs. The Bethlehem Foundry & Machine Co., South Bethlehem, Pa., has taken a 25-ton and a 10-ton traveler from Pawling & Harnischfeger, Milwaukee. The New York Shipbuilding Co. recently placed two 15-ton machines for Camden with the same builder. The Pennsylvania railroad has decided not to buy two 100-ton travelers for which it recently inquired but will equip two old machines with 100-ton trolleys. The Broken Hill Proprietary Co., New South Wales, is understood to have closed on a recent inquiry for two 150-ton ladle cranes, a stripper and two charging machines. The Midvale Steel Co. is asking for one crane. The Balbach Smelting & Refining Co. has awarded the Cleveland Crane & Engineering Co. a contract for a 5-ton machine.

Mill Equipment Purchased in Pittsburgh

Buying of heavy rolling mill equipment is featuring the Pittsburgh market. The United Engineering & Foundry Co. has taken contracts for two butt weld and two lap weld furnaces and a skelp mill for the Jones & Laughlin Steel Co., Pittsburgh, and will furnish one lap weld and one butt weld furnace for the Republic Iron & Steel Co., Youngstown, which is increasing its capacity. The United Company also has received contracts for a universal 28-inch three high billet and slab mill from the Pittsburgh Crucible Steel Co. for installation in its plant at Midland, Pa. The Youngstown Sheet & Tube Co., Youngstown, has awarded several contracts for new 9-inch and 12-inch merchant mills, motors for which will be furnished by the Westinghouse Electric & Mfg. Co. and the Crocker-Wheeler Co. The Cleveland Crane & Engineering Co. will furnish six 15-ton cranes, mentioned in last week's issue of *The Iron Trade Review*.

The William Tod Co., Youngstown, O., has received orders for two blowing engines for the Bethlehem Steel Co. The Wheeling Steel & Iron Co. has purchased six tin plate mills from the Wheeling Mold & Foundry Co., Wheeling, W. Va., for installation in its tin plate plant at Yorkville, O. The Carnegie Steel Co. has purchased six motor-driven lathes and two belt-driven lathes completely equipped and is expected to award contracts shortly for three 5-ton cranes. The Wheeling Mold & Foundry Co. has just purchased a 3-inch banding press and the Pittsburgh & Lake Erie railroad has closed negotiations for a 36-inch punch and a 36-inch bar shear, both motor-driven.

Demand Slackens Materially

Foreign business is becoming more and more unsatisfactory because of uncertain deliveries, and domestic contracts are being given preference at present. New domestic orders, however, are on the decrease. The majority of machine tool makers have sufficient contracts to run their shops at capacity well into the first half of next year, but comparatively little new work is being taken. Railroad buying is eagerly awaited by manufacturers as a boon to the machine tool industry.

Chicago Market Pays Premium

Heavy demand for machine tools in Chicago continues and the only drawback is the inability to obtain sufficient tools to meet demand. Domestic users are more active than usual and for the most part are content either with long deferred delivery or with second hand machines. Prices on lathes, screw machines and other types for which the demand has been heaviest have increased 45 per cent over prices quoted at the beginning of the war. The general advance, taking all forms of machine tools, averages

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about 15 per cent over normal. It is difficult to forecast the future course of prices. One dealer predicts that by January 18-inch lathes, which normally sell at $400 to $500, would be selling at $1,000 each. A purchase of second hand lathes was made recently at prices practically equal to the original cost although the machinery had been in use about 15 years. Demand from Canada has fallen off slightly but this is believed to be only temporary as the demand for machinery for export has not lessened.

EASTERN STATES

BOSTON.—Mead-Morrison Mfg. Co., manufacturer of hoisting machinery, is having plans prepared for a 2-story addition. French & Hubbard, 88 Pearl street, Boston, are the engineers.

NEW BEDFORD, MASS.—Work has been started on a 3-story brick addition, 30 x 420 feet to the plant of Dartmouth Mfg. Co.

HARTFORD, CT.—An 8-acre site has been purchased and buildings will be erected in the near future for the Atkebolaget Svenska Kullagerfabriken, a Swedish corporation, recently incorporated to manufacture ball bearings. Company will be known as the S. K. F. Ball Bearing Co. Plant will be located on the tracks of New York, New Haven & Hartford railroad. B. W. Hanson, of Pratt & Whitney Co., Hartford, is interested.

NEW HAVEN, CT.—Winchester Repeating Arms Co. will erect a 4-story addition, 60 x 134 feet on Sheffield avenue. Contract has been awarded to Aberthaw Construction Co.

WATERBURY, CONN. — American Brass Co. has placed contracts for a 1-story addition, 160 x 224 feet.

PROVIDENCE, R. I.—Harris-Corliss Engine & Machine Co. has incorporated; $400,000 capital stock; by Volney M. Wilson Jr., Barrington, R. I., Richard S. Aldrich, Warwick, R. I., Frank Gibson and Frank L. Hinckley, Providence.

BROOKLYN, N. Y.—A. Schrader & Sons, Inc., 783 Atlantic avenue, will erect a $99,000, 109 x 184-foot, 7-story brick and concrete addition to present plant. Company manufactures diving apparatus and brass fittings. Contract for the construction has been awarded to Turner Construction Co.

HORNELL, N. Y.—Davis Foundry Co. is planning a 2-story, 60 x 100-foot addition.

MONTOUR FALLS, N. Y.—Shepard Crane & Hoist Co. has awarded contracts for an addition, 125, x 200 feet.

ROCHESTER, N. Y. — Vacuum Oil Co. plans the erection of a 41 x 71 x 45-foot brick factory building to cost $20,000 as addition to its Exchange street plant.

ROCHESTER, N. Y.—W. R. Burt Iron & Steel Co. has purchased a site at Scherer and Pomeroy streets and will erect a 100 x 200-foot brick and steel 1-story building.

TROY, N. Y.—W. E. Hunter, representing a New York City syndicate, considers the erection of a power house at the mill of J. B. Hurst which is expected to develop 1,000 horsepower.

BEAVER FALLS, PA.—Pittsburgh Crucible Steel Co. of Midland, Pa., is completing two new open hearth furnaces.

CHESTER, PA.—Stewart Distilling Co., 254 South Third street, Philadelphia, has purchased a large tract of land and will erect an extensive plant for the distillation of alcohol and explosives.

EASTON, PA.—Thomas Iron Co. will install a Croxton slag handling system at Hokendaqua, Pa., and also plans the erection of a large capacity hot-blast stove for No. 3 furnace.

ELLWOOD, CITY, PA.—Steel Car Forge Co. soon will begin the erection of an addition to its machine shops.

ERIE, PA.—Ball Engine Works will build an addition to its boiler house, 25 x 50 feet.

JOHNSTOWN, PA. — Adam Hohmann has been awarded the contract for the Westmont municipal building.

MAUCH CHUNK, P. — Girardsville Gas Co. has awarded a contract for the erection of a $600,000 gas plant to be erected at either Lansford or Coaldale, Pa. New plant will supply Lansford, Summit Hill and Coaldale. Pa., with heat, light and fuel.

NEW CASTLE, PA.—County commissioners are asking bids for two designs for a bridge over the river at State street; either a steel or concrete structure will be erected; bids close Oct. 5.

PHILADELPHIA.—Merchant & Evans Co., Washington avenue and Twenty-first street, has awarded to the Wm. Steel & Sons Co. the contract for a 2-story addition, 60 x 230 feet.

PITTSBURGH. — Pittsburgh & Lake Erie railroad recently has purchased one 36-inch bar shear and one 36-inch punch; both machines are motor driven; new equipment will be installed in the shops at Dickinson Run; additional equipment may be purchased.

PITTSBURGH. — Carnegie Steel Co. has awarded contracts for six motor-driven lathes ranging from 24 inches to 36 inches and two 30-inch belt-driven lathes, completely equipped; the company is negotiating for three 5-ton cranes and will buy some auxiliary equipment for its plant at Braddock, Pa.

READING, PA.—Carpenter Steel Works has prepared plans for another extension 58 x 130 feet, two stories, estimated to cost $30,000.

WAYNESBORO, PA. — Excavations have been started for an addition to the plant of Landis Tool Co. Buildings to be erected will be used as shops and will be 105 x 176 feet, 1-story, brick and steel construction. Contract for structural steel has been awarded to the Belmont Iron Works, Philadelphia. Buildings will be completed and ready for occupancy about Dec. 1 and at that time the working force will be considerably increased.

WEATHERLY, PA. — Weatherly Iron & Steel Co. has increased its working capital $15,000 and will be reorganized as the Weatherly Steel Co. Plant extensions are contemplated.

HARRISON, N. J.—Engine room of Crucible Steel local works was damaged by $3,000 fire.

TRENTON, N. J. — Thermoid Rubber Co. will erect a 2-story, 71 x 190-foot building.

WILMINGTON, DEL. — Wm. Freihofer Banking Co. will erect a power plant, 26 x 137 feet, in addition to other buildings.

BALTIMORE. — Baltimore Tube Co. has ordered the construction of a tube mill, 77 x 141 feet.

SPARROWS POINT, MD.—Maryland Steel Co. is planning an addition to its shipyard shops, 180 x 425 feet.

CENTRAL STATES

AKRON, O. — Granite Clay Co., W. N. Palmer, secretary, 315 Hamilton building, is taking bids on a 125 x 310-foot, 2-story and basement sewer pipe factory building.

CANAL DOVER, O.—Massillon Bridge & Structural Co., Massillon, O., has been awarded a contract for rebuilding bridge over Sugar creek, near Strassburg, O.

CANTON, O.—Cleveland Axle Co. plans the installation of a drop forging plant. Company expects to discontinue the manufacture of axles and devote itself exclusively to the manufacture of drop forgings. Otto Kuepfer is superintendent.

CINCINNATI. — Water works equipment will be needed by Glendale, a suburb, which will add to the pumping facilities of its plant.

CINCINNATI.—Howard Fenker, local manager of White Motor Car Co., will build a general garage and machine shop on Gilbert avenue near Peebles Corner. Building will be 2-story, 50 x 110 feet. Equipment will be needed.

CINCINNATI. — Directors of the Citizen's Artificial Ice Co. have approved the plans for a plant to be erected on Jefferson street. Building will be 100 x 100-foot, brick, steel and reinforced concrete and will cost about $45,000. Plant will have a daily capacity of 50 tons. Company is capitalized at $50,000.

CINCINNATI.—The ornamental iron work for the remodeling of the H. & S. Pogue Co. has been let to L. Schrieber & Sons Co., this city. The Otis Elevator Co. has been awarded the contract to install ten steel elevators for the H. & S. Pogue Co., which will be of the 2 to 1 gearless traction type, and which will cost $50,000.

CLEVELAND.—Weideman Co., West Ninth street and Mandrake avenue, Cleveland, has bought the business of Miller-Everhard, and will erect a 7-story, 88 x 90-foot building on Mandrake avenue adjoining the present plant. Estimated cost of construction is $100,000.

CLEVELAND.—Hubbell & Benes, architects, 4500 Euclid avenue, Cleveland, will prepare plans for an exchange building for the Cleveland Telephone Co. Building will be erected on Cedar road between Coventry and Lee roads, Cleveland Heights, and will cost about $40,000.

CLEVELAND. — National Engineering Co., 504 Marshall building, Cleveland, will extend to a later date, bids for the erection of an automobile factory to be located on East Seventy-nine street and Finney avenue. Building will have 25,000 feet of floor space and will cost about $25,000. Equipment estimated to cost about $25,000.

COLUMBUS.—River Terminal Railroad Co., a subsidiary of Corrigan, McKinney Iron Co., Cleveland, O., has increased its capital stock from $50,000 to $1,000,000.

DAYTON, O.—The plant of the New Era Gas Engine Co. has been leased by the Manufacturers' Production Co., and is being equipped to manufacture shrapnel and high explosive shells.

DESHLER, O.—Baltimore & Ohio and Cincinnati, Hamilton & Dayton railroads plan the erection of depot. George Georgenson, Hamilton, O., has the contract.

ELYRIA, O. — Willys-Overland Co. will erect a $30,000 addition to its plant.

FINDLAY, O.—Crofoot Mfg. Co. has been incorporated; $25,000 capital stock; company will manufacture a device for loading automobiles into freight cars.

NILES, O. — W. R. Harrington, county auditor, will receive bids until Oct. 4 for the erection of the Federal street bridge superstructure.

SPRINGFIELD, O. — William Poole has been awarded a contract for the construction of an addition to the plant of Nolte Brass Works. Buildings will double the capacity of the plant.

WAPOKONETA, O. — F. W. Langhorst, county auditor, will open bids Oct. 9 for two concrete arches to be located at either end of the Hamilton street bridge.

WOOSTER, O. — State industrial commission has approved the increase in capital stock to the amount of $125,000 asked by Wooster Electric Co. A portion of this in-

crease will be used for the extension of service to outlying rural districts.

HUNTINGTON, W. VA. — Virginian railroad has begun work on a 60-mile extension from Mullen to Man, W. Va.

HUNTINGTON, W. VA.—Glass Brick Co., First National Bank building, Cincinnati, has purchased steam power equipment for a new plant. Company is negotiating for pressure blowers.

NORTH MOUNTAIN, W. VA. — Adamantine Clay Products Co. will erect a plant with a capacity of 50,000 brick a day to replace plant recently damaged by fire. Charles D. Gushwa, Martinsburg, W. Va., is president.

POINT PLEASANT, W. VA. — Marietta Mfg. Co., manufacturer of engines, is having plans prepared for extensions.

WHEELING, W. VA.—Wheeling Steel & Iron Co. has awarded Wheeling Mold & Foundry Co. a contract for six mills to be

Co. is purchasing machinery for a mining operation which will be opened shortly. Address R. F. Peters.

JUNCTION CITY, KY.—J. O. Carpenter, Hustonville, Ky., who purchased the electric light franchises is buying equipment.

LEXINGTON, KY.—Fenton Dry Cleaning Co. will purchase power and special equipment for a large plant. S. G. Fenton is in charge of all machinery purchases.

LOUISVILLE.—Henry Vogt Machine Co. is in the market for a 4-column, 1,000-ton hydraulic press. Other equipment will probably be purchased later.

PADUCAH, KY.—Sure Grip Fire Hydrant Wrench Co. has been incorporated; $1,000 capital stock; by A. L. Hays, A. N. McKinney and C. H. Gentry.

PROVIDENCE, KY.—City of Providence will vote in November on $20,000 bond issue

W. H. Holland, C. Workinger and George Snyder.

ALTON, ILL.—Beall Bros. Mining Tool Co. has been awarded a contract for 100,000 dozen shovels.

CANTON, ILL.—The city of Canton is planning the erection of an electric light plant costing $40,000. O. W. Hipple, 745 North Main street, is manager.

CHICAGO.—Continental Bolt & Iron Co. will build an addition costing $6,000. J. N. Wettenstrom is the architect.

CHICAGO. — Francis & Nygren Foundry Co., Fillmore and Rockwell streets, will build 2-story addition costing $5,000. W. Tomlinson is the architect.

CHICAGO.—Royal Metal Mfg. Co. has been incorporated, capital $50,000; by Joseph Salomon, Johanna Salomon and Max Klee, 1340 East Forty-eighth street.

CHICAGO. — Baltimore & Ohio Terminal

A Condensed List of Exceptional Trade Hints

Fulton Iron Works, St. Louis, Mo., is inquiring for the following machine tools; four 14, 18 and 24-inch geared head engine lathes; two shapers; spiral gear hobber to take gears up to 30 to 36 inches; a 54-inch special boring mill with revolving head; a 30-inch Bullard or equal vertical turret lathe; 4 and 6-inch radial drills; three sensitive drills; Jones & Lampson flat turret lathe; Heald grinder; Newton or Lucas horizontal drilling and boring machine, and a gas-fired hardening furnace with an electric pyrometer.

Bids will be received until Sept. 28 by the commissioners of the water works of Benton, Ark., for two 100-horsepower boilers, a 200-horsepower heater, a feed pump, two 500-gallon per minute steam pumps, three 300-gallon per minute centrifugal pumps, a 90-horsepower engine, and a 60-kilowatt generator. J. H. McCrary Co., Little Rock, Ark., is the engineer.

Raymond F. Smith, 210 Lyon street, Grand Rapids, Mich., who is organizing a company to fabricate structural steel, will be in the market shortly for pneumatic machinery, cold saws, drill presses and motor-driven equipment.

The Carnegie Steel Co., Pittsburgh, has recently awarded contracts for considerable equipment and is still in the market for auxiliary equipment for its plant at Braddock, Pa.

Glass Brick Co., First National Bank building, Huntington, W. Va., has purchased steam power equipment and is still in the market for pressure blowers.

Pacific Electric Welding & Mfg. Co., Renton, Wash., has purchased a building and will install considerable machinery for the manufacture of electric welding machines, sheet metal and ornamental iron work. Hugo Thornblade, 4176 Arcade building, Seattle, Wash., is president.

Chattanooga Tennessee River Power Co., Chattanooga, Tenn., now operating hydro-electric power plants on the Tennessee river, will build a power plant on the Duck river, near Shelbyville, Tenn.

Bids will be received until Oct. 16 by the bureau of docks and yards, Puget Sound navy yard, Bremerton, Wash., for three steel tanks of 1,250,000-gallon capacity each.

J. O. Carpenter, Hustonville, Ky., who recently purchased electric light franchises at Junction City, Ky., is buying equipment.

Equipment will be installed by the Nashville Bridge Co., Nashville, Tenn., for the manufacture of shrapnel shells.

Bids will be received until Oct. 12 by the bureau of supplies and accounts, navy department, Washington, D. C., for electrically-driven pumps for the navy yard at Puget Sound, Wash.

The city of Nashville, Tenn., will purchase stokers for the boilers at the electric light plant.

Considerable special and transmission machinery will be purchased by the Sylvan Cotton Mills Co., Shelbyville, Tenn.

Slayton Power Co., Slayton, Minn., plans to enlarge its plant and will add a 100-horsepower engine run by oil, steam, or producer gas, together with an electric generator and switchboard. F. H. Eddy, is manager.

Bids will be received until Oct. 5 by G. T. Hatten, mayor, Sidney, Ia., for water works improvements, including a 200-gallon per minute triplex power pump, and a 35-horsepower internal combustion engine.

installed at the Yorkville, O., plant. Contract for the structural steel work has not been let. I. M. Scott, Main and South streets, is in charge of the work.

WHEELING, W. VA.—LaBelle Box Co. will rebuild its box factory recently damaged by fire.

WHEELING, W. VA.—Auto Accessories Co., recently incorporated, will manufacture a device patented by P. F. Haberstick.

WHEELING, W. VA. — Sturn Machinery Co. plans to build a foundry; W. W. Krause is manager of the company.

WHEELING, W. VA.—Wheeling Mold & Foundry Co. has purchased a 3-inch banding press and may buy additional machinery for the manufacture of war material.

CARLISLE, KY.—Carlisle Electric Light & Power Co. will purchase an ice machine of 20-ton capacity for installation by April, 1916.

HAZARD, KY.—Perry County Block Coal

for an electric light plant. Address the mayor.

ANDERSON, IND.—Hill Pump Co. has been incorporated to manufacture pumps; capital stock, $250,000; by Hugh Hill, G. B. Ayers and E. M. Wilson.

ELKHART, IND. — Sidway Mercantile Co., through Elwood & Elwood, architects, South Main street, is taking bids on a 4-story factory building and two additions to present plant.

EVANSVILLE, IND.—Anchor Supply Co. will ask bids about Oct. 30 on a 5-story factory, 50 x 150 feet, on plans by Clifford Shopbell & Co.

INDIANAPOLIS.—Nordyke & Marmon Co., manufacturer of milling machinery and automobiles, is planning to erect a factory costing $10,000.

SOUTH BEND, IND.—Holland Machine Co. has been incorporated to manufacture special machinery; capital stock, $152,500; by

Railway Co. will build a 2-story round house and machine shop on West Fourteenth street at a cost of $245,000. M. A. Long is the architect.

CHICAGO. — Delta Star Electric Co., 617 West Jackson boulevard, is taking bids through its architect, R. G. Pierce, 10 South La Salle street, for a factory, one story, 99 x 110 feet.

CHICAGO.—Plans are nearly ready for an armory building for the First Cavalry Illinois National Guard, by state architect James B. Dibelka, 128 North Fifth avenue, five stories, 200 x 300 feet, of pressed brick, stone and structural steel to cost $200,000.

ST. CHARLES, ILL. — Moline Malleable Iron Works, recently damaged by $80,000 fire, will be rebuilt. Plans for building have been completed but R. R. Fauntleroy announced the plant will be constructed of brick and steel and thoroughly fire proof.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery to Dec. 31.)

Bessemer, valley	$16.00
Bessemer, Pittsburgh	16.95
Basic, Pittsburgh	15.95
Basic, eastern Pa.	17.00
Malleable, Pittsburgh	15.45 to 15.95
Malleable, first half, Pbgh.	15.95
Malleable foundry, Chicago	15.00
Malleable foundry, Philadelphia	15.75 to 16.25
Malleable foundry, Buffalo	15.00 to 15.50
No. 1X foundry, Philadelphia	16.75 to 17.00
No. 2 foundry, Pittsburgh	15.45 to 15.95
No. 2 Fdy., first half, Pbgh.	15.95
No. 2 foundry, valley	15.00
No. 2 foundry, Cleveland	14.50 to 15.00
No. 2 foundry, Ironton	14.50 to 15.00
No. 2 foundry, Chicago	14.25
No. 2X foundry, Philadelphia	16.25 to 16.75
No. 2X fdy., N. J. tidewater	16.25 to 16.75
No. 2X foundry, Buffalo	15.00 to 15.50
No. 2 plain, Philadelphia	15.50 to 15.75
No. 2 plain, N. J. tidewater	15.75 to 16.25
No. 2 plain, Buffalo	15.00
No. 2 southern, Birmingham	11.50
No. 2 southern, Cincinnati	14.40
No. 2 southern, Chicago	14.50 to 15.00
No. 2 southern, Phila. delivery	15.50 to 16.00
No. 2 southern, Cleveland	15.50
No. 2 south'n, New York docks	15.50 to 16.00
No. 2 southern Boston, docks	15.50 to 16.00
No. 2 south. interior, New Eng.	16.50 to 17.50
No. 2 southern, St. Louis	15.90
Virginia No. 2X furnace	13.25 to 13.50
Virginia 2X, Philadelphia	16.00 to 16.75
Virginia 2X, Jersey City	16.35 to 17.10
Virginia 2X, Boston points	16.50 to 17.25
Gray forge, eastern Pa.	15.00 to 15.25
Gray forge, Pittsburgh	14.95 to 15.20
Gray forge, first half, Pbgh.	15.20
Gray forge, Birmingham	9.00
Silveries, 8 per cent, Jackson, O.	17.00 to 17.50
Silveries, 5 per cent Birmingham	13.00
Silveries, 5 per cent, Chicago	17.85 to 18.00
Standard low phos., Phila.	24.00 to 24.50
Lebanon low phos., furnace	19.00 to 20.00
Low phos., Pittsburgh	24.00 to 24.50
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	16.25 to 16.75
Charcoal, Buffalo	16.75 to 18.25
Charcoal, Birmingham	21.50

IRON ORE

Lake Superior Ores.
(Lower lake ports.)

Old range Bessemer, 55 per cent.	$3.75
Mesabi Bessemer, 55 per cent.	3.45
Old range, non-Bess., 51½ per cent.	3.00
Mesabi non-Bessemer, 51½ per cent.	2.80

Foreign Ores.
(Per unit Philadelphia.)
(Prices nominal.)

Foreign Bess., 50 to 65 per cent.	8 to 8½
For'n non-Bes., 50 to 65 per cent.	8 to 8½

COKE

(At the ovens)

Connellsville furnace	$1.70 to 1.75
Connellsville fur. contr. (nom.)	1.90 to 2.00
Connellsville foundry	2.30 to 2.60
Connellsville fdy. contr.	2.40 to 2.70
Wise county furnace	2.00 to 2.25
Wise county foundry	2.40 to 2.60
Pocahontas furnace	2.00 to 2.50
Pocahontas foundry	2.25 to 2.50
New River, foundry	2.50 to 3.25
New River, furnace	2.25 to 2.50

FERRO ALLOYS AND STEEL MAKING METALS

Ferro mang., furnace (prompt)	110 to 115
Ferro mang., Balti. (future)	100.00
Spiegeleisen 20 per cent, furnace	28.00
Ferro-silicon, 50 per cent, Pbgh.	73.00 to 75.00
Ferro-silicon, 50 per cent, Phila.	73.00 to 75.00

Bessemer ferro-silicon, 9 per cent to 10 per cent, $19; 10 to 11 per cent, $20; 11 to 12 per cent, $21; 12 to 13 per cent, $22 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-chrome, 4 to 6 per cent carbon, 20 cents per pound; 2 per cent carbon, 40 cents per pound, delivered.

Ferro-vanadium, $2.25 to $2.30 per pound of contained alloy, Pittsburgh.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

Nickel, 50 to 55 cents per pound.

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.40
From Pittsburgh	.619
From Youngstown	.619
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

Ferro-tungsten, nominal, at $3 to $3.50 per pound of contained alloy.

Cobalt metal, $1.60 to $1.75 per pound, Pittsburgh.

Aluminum, 55 cents per pound, New York.

Ferro-molybdenum, Pittsburgh, nominal.

SEMI-FINISHED STEEL

Open hearth billets, Phila.	$30.00 to 32.00
Forging billets, Phila.	34.00 to 38.00
Forging billets, Pbgh.	33.00 to 35.00
Forging billets, Chgo.	32.00
Wire rods, Pittsburgh	29.00 to 30.00
Bess. bill., Youngstown	24.00 to 25.00
Open hearth billets, Youngstown	25.00 to 26.00
Bessemer billets, Pittsburgh	25.00
Open hearth billets, Pittsburgh	26.00
Bess. sheet bars, Youngstown	25.00
Op. h'th sheet bars, Youngstown	25.00 to 26.00
Bess. sheet bars, Pittsburgh	25.00 to 26.00
Op. h'th sh. bars, Pbgh.	26.00 to 26.50
Muck bar, Pittsburgh	27.00 to 28.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Light rails 8 to 10 lbs. Pbgh.	1.40c
Light rails 8 lb. Chgo.	1.31c
Light rails 12 to 14 lbs. Pbgh.	1.35c
Light rails 12 lbs. Chgo.	1.26c
Light rails 16 to 20 lbs. Pbgh.	1.30c
Light rails 16 to 20 lbs. Chgo.	1.21c
Light rails 25 to 45 lbs. Pbgh.	1.25c
Light rails 25 to 45 lbs. Chgo.	1.16c
Relaying rails, standard, Pbg. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chgo.	21.50 to 22.50
Angle bars, st. sect. Pbgh. base.	1.50c
Angle bars st. sections, Chicago	1.50c to 1.75c
Spikes, railroad, Pbgh.	1.50c to 1.55c
Spikes, railroad, Chgo.	1.65c to 1.75c
Track bolts, Pbgh.	2.00c to 2.10c
Track bolts, Chgo.	2.10c to 2.25c
Tie plates, Chgo.	30.00 to 32.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.25 to 1.60
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago, to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.35c
Structural shapes, Chgo.	1.54c
Structural shapes, Philadelphia	1.509c
Structural shapes, New York	1.519c
Struc. shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.49c to 1.54c
Tank plates, Pittsburgh	1.35c
Tank plates, Philadelphia	1.509c
Tank plates, New York	1.509c
Bars, soft steel, Pittsburgh	1.35c
Bars, soft steel, Chicago	1.54c
Bars, soft steel, Philadelphia	1.509c
Bars, soft steel, New York	1.469c
Hoops, carloads, Pittsburgh	1.40c
Bands, Pittsburgh	1.35c
Shafting, Pbgh., contr. car loads	62 off
Bar iron, Chgo.	1.35c
Bar iron, Philadelphia	1.459c
Bar iron, New York	1.469c
Bar iron, Cleveland	1.30c to 1.40c
Bar iron, Pittsburgh	1.40c
Hard steel bars, Chicago	1.30c to 1.35c
Smooth finish, mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.90c to 2.00c
No. 28, black, Chicago	2.14c to 2.19c
No. 28, tin mill, black, Pbgh.	1.85c
No. 28, galvanized, Pbgh. nom.	3.60c to 4.00c
No. 28, galvanized, Chgo.	3.79c
No. 10, blue anld., Pbgh.	1.50c to 1.60c
No. 10, blue, annealed, Phila.	1.659c to 1.759c
Tin plate, 100 lb., coke base	3.10c to 3.20c

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll, and re-anl.	30 cents
Hot roll'd pick'd and anl., tin mill	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller leveling	10 cents
Patent leveling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free from mill scale	55 cents
Special open hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black. Butt-weld.	Galv. Butt-weld.
Steel, ¼ to 3 inches	79	63½
Iron, ¼ to 2½ inches	71	52
	Lap-weld.	
Steel, 2½ to 6 inches	78	62½

BOILER TUBES

Steel, 3½ to 4½ inches l. c. l.	72
Iron, 3½ to 4½ inches l. c. l.	61

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

Wire nail jobbers, Pittsburgh	$1.75
Plain wire, jobbers, Pittsburgh	1.60
Galvanized wire, jobbers, Pbgh.	2.30
Polished staples, Pbgh.	1.90
Galvanized staples, Pbgh.	2.60
Barb wire, painted, jobbers, Pbgh.	1.90
Barb wire, galv., jobbers, Pbgh.	2.60